THE CITY OF REDMOND

HAZARD MITIGATION PLAN

Updated: July 15, 2004

Hazard Mitigation Plan Guide

RED: **Community Process**

Development, Implementation, Adoption, and Maintenance

YELLOW: **Hazard Identification Vulnerability Analysis (HIVA)**

GREEN: **Hazards Mitigation Plan**

July 2004

City of Redmond

Hazard Mitigation Plan

Document One:

Community Process

Development, Implementation, Adoption, and Maintenance

COMMUNITY PROCESS

Development, Implementation, Adoption, and Maintenance

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EXECUTIVE SUMMARY

The Hazard Mitigation Plan defines a process for identifying, quantifying, and reducing risk in the City of Redmond. The plan is the product of hazard and vulnerability analysis, risk reduction planning development, action items and implementation process identification, through community processes.

The plan is divided into three sections:

The Community Process section describes the development, maintenance, implementation, adoption activates, and the participation of the resource agencies as well as the public.

The Hazard Identification and Vulnerability Analysis or HIVA section describes the risks qualitatively and quantitatively and drives the goals, objectives and development of action items.

The Hazards Mitigation Plan is the third section. This section presents the vision of Redmond, as described in the Comprehensive Plan, in terms of risk reduction goals, objectives and action items.

The plan has been crafted so that future maintenance and implementation activities are captured within pre-existing City processes. The implementation committee includes the Public Works, Finance, Planning, and Fire departments, while the maintenance process is led by the Planning Department and is strongly tied to the comprehensive planning effort. The implementation process is linked to the CIP and budgeting process. These processes are comprehensive and have been designed to include public participation.

The development effort in producing this plan has taken three years, included public hearings, and City staff participation. Faculty, staff, and students from the University of Washington have contributed greatly in the development of all three documents that comprise this plan. In the future, the Hazard Mitigation Plan will be used to reduce community risk and move Redmond further towards sustainability.

INTRODUCTION

This is the first of three documents that constitute the City of Redmond Hazard Mitigation Plan, detailing hazards, vulnerabilities, risk reduction, and management processes. The other two documents are the Hazard Identification and Vulnerability Assessment (HIVA) and the Hazards Mitigation Plan. The HIVA profiles both hazards and vulnerability and offers three probable disaster scenarios. The Hazards Mitigation Plan document identifies goals, objectives and action items. This document describes processes the City will use to implement, monitor, and maintain a Hazard Mitigation Program. It also describes the development process.

Adoption by the City of Redmond Council

201.6 (c) 5

The Hazard Mitigation Plan was adopted by the City Council on _____, as Resolution # _____ and under the title _____.

Multi-Jurisdictional Participation

201.6 (a) (3)

The City of Redmond is participating with King County to produce a countywide plan. It is anticipated that the Redmond Mitigation Plan will be incorporated into the King County Mitigation Plan. However, it is also anticipated that the Redmond plan will be completed and adopted prior to the county plan. Additionally, the City of Redmond participates in several multi-jurisdictional planning processes with a direct bearing on risk reduction in the City. These include regional water issues, fire, medical and hazardous materials response coordination, regional land planning, and lifeline issues like the Olympic Pipeline and transportation.

PLANNING PROCESS

201.6 (c)(i)

The HIVA, and the Hazards Mitigation Plan document are the products of a number of contributors in the City of Redmond, supported by a research and development team from the University of Washington. Please see attachment x for contributor details.

Contributors Include:

City of Redmond

Mayor Rosemarie Ives was interviewed on April 4, 2002 on her vision and planning directions for Redmond. She also shared her growth plans and goals for the City.

Warren Shill, City Project Coordinator and Plans Examiner in the Building Division, provided guidance and direction as well as information for the plan throughout the winter of 2002.

Redmond Fire Department

Fire Chief John Ryan

Robert Schneider, Redmond Emergency Manager, was often in contact with others working on the project and aided in the gaining of information regarding the vulnerability of the City during May and June of 2002.

Bob Lovett, Fire Marshal, completed fire risk and wildland/urban interface fire assessments and emergency responses. He was also interviewed on March 12, 2002.

Desiree' Knemeyer, Supplemental Intern for the Redmond Emergency Manager, was involved in the revision and editing process of the documents.

Redmond Police Department

Commander Ed Billington worked with civil unrest and terrorism and gave elaboration during a meeting on February 15, 2002

Redmond Department of Planning & Community Development

Roberta Lewandowski, Planning Director, provided the comprehensive plan and community development guide process

Jim Roberts, Assistant Planning Director, provided comprehensive plan and community development guide process and economic development.

Kim van Ekstrom, Community Affairs Manager, organized news releases, television, and work with Focus Magazine.

Terry Shirk, Senior Planner, tracked economic development and compiled a list of historic structures in Redmond.

Dianna Broadie, Planner, aided in the development of the Comprehensive Plan and Community Development Guide related to the Old Town plan and historic structures. She created mutual understanding through three conversations taking place on February 15, April 19, and June 7, 2002.

Patrick Hirsch, Program Administrator, Community Affairs Division, worked with Redmond TV through taping of the sessions.

Sue Simpson, Plans Examiner in the Building Division, provided building code information related to earthquakes

Redmond Public Works Department

Bill Campbell, Assistant Director and Specialized Expert, provided information on landslides in the Redmond City limits.

Bob Franklin, FEMA Flood Insurance Program Coordinator

Thomas Barry, Engineer, Natural Resources Division, provided groundwater information during an interview on March 4, 2002.

Deborah Canfield, Engineering Technician, Transportation Division, provided traffic information during an interview pertaining mainly to traffic planning and isolation issues.

Kate Krafft, King County Landmarks Program Coordinator, was able to provide information on incentives for retrofitting. She had been interviewed on June 7th, 2002

Redmond Information Services Division

Eric McConaghy, Program Analysis (GIS)

University of Washington

Project Coordinator:
Bill Sanderson

Principle Investigators:
Bob Freitag
Frank Westerlund

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Andy Bohlander
Sarah Hawkins
Patty Julio
Ingrid Lundin
Suzanne Rooijackers
Colleen Whitten Srull

Hazard Inventory and Vulnerability Assessment

The groundwork for the Hazard Mitigation Plan began in the spring of 2001. This document identifies risk and vulnerability within the City of Redmond. Risk was defined as a function of the hazard and the vulnerability. After defining risk, the vulnerabilities of the City of Redmond to a variety of hazards, including earthquakes, flooding, winter storms, terrorism, civil disturbance, and wildland interface fires were identified. Vulnerabilities in the City of Redmond were found to include: the residents, small businesses, major corporations, regional lifelines, local government infrastructure and the historic district.

Scenario Development

Scenarios were developed to help guide actions items. The scenarios were developed to help illustrate identified vulnerabilities and facilities public participation. Three probable scenarios were developed:

Hazard Scenario 1: Large-Scale Regional Event

This event would impact the entire Puget Sound region and could be a shallow Seattle Fault earthquake.

Hazard Scenario 2: Small-Scale Localized Event

This event would more likely be scattered, smaller events impacting Redmond, such as a landslide that washes out a road and results in short-term isolation.

Hazard Scenario 3: Catastrophic Localized Event

This event is one that would cause extreme damage in Redmond, such as a pipeline explosion or a terrorist event.

Public Process

Public process was an important step in the creation of the Hazard Mitigation Plan document, the HIVA, and the Hazard Mitigation Plan. The process began in January of 2002 with background research done by University of Washington personnel and included interviews with City subject matter experts. An effort was made each step of the way to inform the public of Redmond and to solicit comments regarding the planning process and findings. City staff meetings were held to inform employees as well. Public presentations were held four times between February and May of that year, including a televised rebroadcast of the plan. By October 2002, the plan was made available to view on the Internet, and an article was printed in Focus Magazine. Since that time, the Hazard Mitigation Plan has been in the processes of addition and revision. However, continued public involvement in addressing mitigation issues has been accomplished through Comprehensive Plan and Community Development Guide updates and through the CIP process.

- January 2002 – UW & City begin mitigation work - Winter & spring quarter agreement.
- 1st qtr 2002 – Short Article in City's Focus newsletter.
- February 4, 2002 – Mitigation Class meets with Mayor. She discusses her position on growth and goals for the City.
- February 20, 2002 – Final presentation for the Hazard Mitigation Plan proposal. Gould Hall for City representatives.
- March 14, 2002 – Final presentation of the Multi Hazard Mitigation Plan (Joan Sterling/Tammi Clark/Luke Meyers - EMD attend), Council chambers
- April 19, 2002 – Class meets with Roberta Lewandowski, Planning Director, and discusses how a major catastrophe might affect our downtown.
- May 22, 2002 – Press release pertaining to the presentation of the Plan document.
- May 29, 2002 – Hazard Mitigation Plan document and appendices' public presentation televised live and recorded for rebroadcast – played on Redmond channel multiple times.
- June 18, 2002 – Received written Hazard Mitigation Plan document. Included in it were the Appendices to the Hazard Mitigation Plan Redmond Recovery and Restoration Plan, Multi-Hazard Mitigation Plan proposal, and the Hazard Identification Vulnerability Analysis.
- August 2002 – Printed and copies sent to State EMD.

- September 2002 - Adoption by Redmond City Council of Community Development Guide update on Hazardous Liquid Pipelines. This update established minimum setback requirements from the Olympic Pipeline and was developed through a public process.
- October 4, 2002 – Plan posted to internet - Citywide email requesting comments.
- October 8, 2002 – Focus newsletter piece - 4 qtr published.
- March 31, 2003 - Public hearings on Preliminary Preferred Growth Strategies.
- May 6, 2003 - Adoption by Redmond City Council of Community Development Guide update to our Historic Preservation Regulations.
- May 20, 2003 - Assessment of Redmond's Water System Vulnerability by Economic and Engineering Services begins.
- June 16, 2003 - Adoption by Redmond City Council of Community Development Guide update to our Shoreline Master Plan.
- September 16, 2003 - Adoption by Redmond City Council of Comprehensive Plan Amendments to add an Updated Vision, Goals and Framework Policies Chapter.
- October 21, 2003 - Final adoption by Redmond City Council of the Wellhead Protection Ordinance. The Wellhead Protection Ordinance establishes regulations for the protection of the City's wells and aquifers and was developed through a public process.

Electronic forms of communication will be maintained in the future through all processes (development, maintenance, implementation, and adoption). Further, public meetings will be held during maintenance, implementation, and adoption. The public will be heard during budgetary hearings regarding chosen projects, including CIP projects.

Risk Assessment, Profiling Hazard Events, Assessing Vulnerability

201.6 (c)(2)(i), 206.6 (c)(2)(ii)(A), 206.6 (c)(2)(ii)(B), 206.6 (c)(2)(ii)(C)

These areas are well documented in the Hazard Identification and Vulnerability Assessment (Part Two of this plan). The document includes a description of all hazards in the jurisdiction; provides a description of all vulnerabilities in the jurisdiction; addresses the impact of hazards in the community; identifies types and numbers of vulnerable buildings; addresses vulnerability of future buildings; identifies the jurisdiction's repetitive loss areas; identifies the sources used to determine the hazards and vulnerabilities; indicates the data limitations; justifies the elimination of hazards as appropriate; identifies and profiles manmade hazards; identifies vulnerable assets; estimates potential dollar loss; describes methodology for estimate; describes land use and development trends; and describes related vulnerability.

Mitigation Plan

201.6 (c)(3)(I)

The City of Redmond Mitigation Plan (attached) describes the mitigation goals as long-term and global visions and indicates how the Goals were developed. Further, the Mitigation Plan reflects the findings of local and state risk assessments, as well as presents a long-term vision for

hazard reduction and enhanced mitigation capabilities. The Mitigation Plan details actionable objectives. These objectives will be evaluated annually as opportunities. Chosen opportunities will be added to a multi-year mitigation work plan.

Major Mitigation goals taken from the Redmond Mitigation Plan

1. Increase Community Resiliency to Large Scale Regional Events (including local government infrastructure, critical facilities, and lifelines).
2. Reduce vulnerability of single-family homes
3. Reduce vulnerability of small businesses
4. Reduce vulnerability of large corporations
5. Reduce potential for isolation - disrupted lifeline and infrastructure
6. Reduce exposure to high-risk facilities and utilities (including local government infrastructure, critical facilities, and lifelines)
7. Preserve and Enhance the Natural Environment
8. Reduce vulnerability of historic and cultural resources
9. Create recovery plan for Redmond historic district

Identification and Analysis of Action items

201.6 (c)(3)(ii)

The City of Redmond Mitigation Plan (attached) identifies a comprehensive range of specific mitigation actions and projects for each hazard. The document identifies a range of specific mitigation actions for the reduction of risk to new and existing buildings and infrastructure, environment, and population. The Plan Administration and Mitigation section of this document details the process by which the community decided on particular mitigation measures and by which the community will decide mitigation measures to implement.

Further Analysis Requirements:

This Hazards Mitigation Plan and City of Redmond acknowledge that these action items have not gone through a rigorous and detailed environmental, historic or benefit to cost analyses. Although such considerations played a role in the prioritization of these action items, largely through the development of the probable scenarios, further analyses will be undertaken before these action items become scheduled for implementation.

CEPA, Historic Preservation Act, and benefit to cost requirements and guidance will be met by the City of Redmond. Also, the City of Redmond will take advantage of the newly developed benefit to cost software made available by FEMA before project implementation

PLAN ADMINISTRATION AND IMPLEMENTATION

201.6 (c)(3)(iii)

Purpose

To describe the process through which the City of Redmond will manage the Hazard Mitigation Plan as a current document with goals, objectives and actions that are implemented on a yearly basis for the function of risk reduction. The primary products of this process are an annual evaluation document and a multi-year work plan for mitigation actions. Administration and implementation include the monitoring and evaluating of the effectiveness of the mitigation efforts, the capturing of opportunities, and the changing requirements of the community.

Primary Agencies

- Department of Planning and Community Development (Planning)
- Public Works Department (Public Works)
- Fire Department, Office of Emergency Management (Emergency Management)
- Department of Finance (Finance)

Process

Personnel from Planning, Public Works, Emergency Management, and Finance will form a Mitigation Implementation Committee. Planning, Public Works, and Emergency Management will serve as implementation planners, while Finance will advise on budgets and cost/benefit analysis. This committee will be convened by the Director of Planning and will lead the community effort in risk reduction. The committee will monitor the progress of the mitigation program and select and prioritize action items for implementation.

Annually, the implementation committee will:

1. Review the progress and effectiveness of mitigation actions and produce a report for the Mayor on the effectiveness of mitigation actions.
2. Review the Mitigation actions and identify opportunities to implement recommended action items.
3. Solicit mitigation ideas from City Department Heads and through public comment.
4. Identify internal and external funding sources. Emergency Management will identify complementary grant funding as available.
5. Rank current and potential actions according to risk reduction and implementation opportunity.
6. Task the development of external funding for risk reduction. Planning will take the lead in this effort.
7. Identify actions that will require a cost/benefit analysis and conduct them as required. The cost/benefit analysis will conform to current and standing Redmond policy.

8. Modify the goals, objectives and actions in the Mitigation Plan as deemed necessary to take advantage of risk reduction opportunities.
9. Coordinate action items with CIP process, the comprehensive planning process, and other City processes as necessary.
10. Create a proposal for multi-jurisdictional mitigation goals, objectives and actions.
11. Develop a multi-year work plan of actions (checklist attached).
12. Create an Outreach actions document. Identify and facilitate community actions including those of volunteers supported by the City. Emergency Management will take the lead in this activity.
13. Hold public meetings to keep the community informed on mitigation opportunities and what is being implemented to increase community preparedness.

Work Plan Checklist

1. Rate the mitigation actions.
2. Identify if the project requires a benefits/cost analysis.
3. Identify staff to perform the benefit/cost analysis as required.
4. Assign lead responsibility for each activity; oversight of implementation, and monitoring.
5. Assign City, community, and outside resources (volunteer, professional).
6. Assign a budget to each project.
7. Identify the source of funds, internal as well as external, and determine if the FEMA guidelines apply. Source: Attachment #4, "Guidelines of the Cost/Benefit Analysis of RDM Applications."
8. Assign the timing of the project.
9. Request comment on the impact of a budget from affected budgetary heads.
10. Schedule viable actions into a 3-year work plan.
11. Note any discontinued or completed actions. Identify reason and captured benefits.
12. Submit actions in the mitigation work plan into the budget process.
13. Revise the work plan to reflect the actions that were funded.

PLAN MAINTENANCE

201.6 (c)(3)(iii)

Purpose

To describe the process through which the City of Redmond will maintain and update its Hazard Mitigation Plan and the underlying documents. The process will aid the City in capturing opportunities and changing requirements of the community by basing the plan on current risk and strategic analysis.

Primary Agencies

- Department of Planning and Community Development (Planning)
- Public Works Department (Public Works)
- Fire Department, Office of Emergency Management (Emergency Management)

Process

The City of Redmond Hazard Mitigation Plan is a companion document to the Comprehensive Plan prepared by the Planning Department and will be prepared in the same timetable as the City's Comprehensive Plan. The responsible and lead agency for these mitigation actions will be the Planning Department. Planning will take the lead in maintaining the HIVA, revising the Hazard Mitigation Plan document, and recommending changes in and revising the Process document. These three parts constitute the Hazard Mitigation Plan.

In addition to driving the Hazard Mitigation Plan, the HIVA will influence the City Comprehensive Plan (planned land usage), the Redmond Recovery Plan, the Capital Improvement Process, and the Emergency Response Plan. Identified hazards from the HIVA are evaluated by the Mitigation Implementation Committee and prioritized. Priority projects are then coordinated into the Capital Improvement Process or the Comprehensive Planning process for funding and implementation.

As lead agency, the Planning Department will work closely with Emergency Management and Public Works in order to update the goals, objectives and actions annually.
The Planning Department will solicit public comments through public notices and meetings, plus meet with stakeholders annually to review proposed mitigation actions. Public comments and input will be considered by the Mitigation Implementation Committee. Additionally, Planning will maintain a Mitigation Plan web site. This site will include the current work plan, the Hazard Mitigation Plan, HIVA, and Community Process documents.

Schedule

The City of Redmond Comprehensive Plan is produced on a 5-year cycle. As a companion document, the Hazard Mitigation Plan will be updated on the same cycle. The update of the HIVA will be the initial step in developing both of these documents. In order to meet the planning schedule, the HIVA will be developed in 2004 with the completion of updated plans in 2005.

Goals, Objectives and Actions Scheduled for Work Plan Review 2003-2005

The following goals, objectives and actions are drawn from the Hazards Mitigation Plan, they broadly identify actions from which the implementation committee may select and draw specific action items. It is expected that the committee will modify these ideas or select alternative mitigation projects, as appropriate at the time.

GOALS AND OBJECTIVES FOR COMMUNITY RESILIENCE AS TAKEN FROM THE HAZARDS MITIGATION PLAN

Goal 1: Increase Community Resiliency to Large Scale Regional Events

Objectives:

1. The City of Redmond will conduct structural surveys of its facilities against probable hazards and determine the costs/benefits of retrofitting.
   a. Schedule feasible retrofits.
   b. Secure all non-structural items that could be a hazard through non-structural retrofitting.
2. Locate critical functions in the most hazard resistant facilities.
3. Identify a viable alternate EOC location outside of the valley.
   a. This location will be set up to facilitate the mobile command center.
   b. Necessary equipment, communications, and information technology infrastructure will be pre-staged at his location according to a design for the site prepared by the Fire and Police departments.
4. Emergency Management will review the mutual aid agreements with Fire, Police, and Public Works, and recommend changes as required.
5. The City will work with neighboring cities and the county to update the existing Emergency Response Plan to include guidelines and operating procedures for dealing with inadequate resource shortfalls during the initial stages of a disaster.
6. The City will develop the ability to model its hazards and vulnerability using a GIS system, HAZUS, and other applicable software.
   a. The City will develop the ability to capture vulnerable facilities, populations, natural systems, and infrastructure to generate risk maps by modeling the hazards. These capabilities will be used to create risk maps and HIVAs also used in preparedness, response, and recovery.
   b. Continue risk mapping efforts and use to enhance mitigation into land use planning.
7. The City will enhance its "Disaster Preparedness" website.
   a. Provide a web-based portal for public communication during all stages of a disaster.
   b. The website will include information about 3-day preparedness, family planning, and local hazards.
8. Establish a relationship with a radio station(s) to distribute public information messages regarding preparedness and mitigation and to provide "official" emergency information.
9. Develop a series of regionally available public workshops or seminars to educate homeowners and local businesses on earthquake-resilient practices.
10. Review hazard zones and critical areas in Redmond (i.e., wetlands, aquifer recharge areas for potable water, fish and wildlife habitat conservation areas, frequently flooded areas, geologically hazardous areas) and restrict development in these areas through the Comprehensive Plan and ordinance.
11. Develop policies that will limit the placement of critical infrastructure facilities in hazard-prone or areas that are served by vulnerable lifelines.

12. Identify and publicize incentive-based programs to encourage homeowner mitigation actions.

Goal 2: Reduce Vulnerability of Single Family Homes

Objectives

1. Implement neighborhood-based risk reduction programs.
2. Reduce vulnerability to landslides.
   a. Inventory slopes under City control.
   b. Restore stability of degraded slopes through re-vegetation and slope stabilization efforts.
   c. Work with other property owners to stabilize slopes.
3. Apply building codes requiring flood-proofed homes in the floodplain and regulations specifying no-fill floodplain, zero-rise floodway analysis, and vegetation retention standards throughout Bear Creek.
4. Develop partnerships with FEMA and local organizations to promote disaster mitigation and preparedness strategies.
   a. Emergency Management will work with community-based organizations to promote mitigation and supportive preparedness actions.
5. Supplement the community's response capability after a disaster by recruiting auxiliary responders.
6. The Fire Department will create risk maps for the urban/wildfire intermix.
7. The Fire Department will create a program for reducing fuels and creating defensible areas.
8. The Fire Department will model hazardous material risk neighborhoods and target information to risk-prone neighborhoods. This information will include sheltering and evacuation information.

Goal 3: Reduce Vulnerability of Small Businesses

Objectives

1. Emergency Management will establish a relationship with existing community organizations to promote business continuity and risk reduction.
   b. Train business owners to properly secure all non-structural items that could be a hazard through non-structural retrofit training.
   c. Train business owners to create alliances and take mitigation actions that will protect supply chains and cash flows.
2. Community Development will design events to promote business risk reduction.
3. Emergency Management and Community Development will facilitate partnerships and sharing of resources between small businesses and large corporations.
4. The City will develop strategies to encourage property owners to retrofit un-reinforced masonry buildings.

Goal 4: Reduce Vulnerability of Large Corporations

Objectives

1. Use hazard scenarios and involve the business community in risk assessment. Conduct an economic impact analysis.
2. Develop a Project Impact-style program that focuses on raising citywide public awareness of business mitigation planning.
3. Partner with the Redmond Chamber of Commerce and the Small Business Administration to plan and develop a Business Resource Center.
4. Encourage large corporations to include their small business vendors and tenant businesses in their emergency management planning.
5. Facilitate cooperative agreements between large corporations and local small businesses in a recovery scenario.

Goal 5: Reduce Potential for Isolation - Disrupted Lifeline and Infrastructure

Objectives

1. Cooperate with neighboring jurisdictions, Planning, and transportation agencies to harden vulnerabilities of transportation routes.
2. Reduce vulnerability of key transportation routes within Redmond to natural hazard events.
3. Perform seismic upgrades of bridges and roadways.
4 Increase travel route redundancy.
5. Support transit systems through transportation improvements.
6. Reduce the vulnerability of utility infrastructure, hubs, and distribution systems.
7. Ensure adequate function of citywide Tolt water distribution.
8. Preserve the open and uncontaminated state of key aquifer recharge areas.
9. Assess the vulnerability of the electricity transmission center.
10. Reduce the vulnerability of wire-dependent utility systems.
11. Identify and mitigate points of vulnerability for sewer infrastructure.
12. Prepare for adequate waste storage and management in response to a hazard event.
13. Ensure public sector response capability.
14. Develop response strategies based on route priorities.
15. Strengthen private sector role in response capability.

Goal 6: Reduce Exposure to High-Risk Facilities and Utilities

Objectives

1. Reduce the risk surrounding an Olympic Pipeline rupture.
2. Reduce the vulnerability of high-risk utility and facility infrastructure to hazard events.
3. Ensure adequate response capability.
4. Educate neighboring residents about hazard and associated risks.

Goal 7: Enhance the Natural Environment

Objectives:

1. Restore natural drainage capacity and structure of streams and wetlands to address future changes in flows.
2. Identify areas of opportunity for stream and floodplain restoration following hazard events.
3. Identify areas of opportunity for storm water retrofitting to maximize drainage infrastructure.
4. Target landslide-prone areas for pre- or post-event restoration and acquisition.
5. Respond to changing patterns of hazard events, particularly floodplain modifications
6. Pursue public land acquisition strategies and landscape-level habitat coordination efforts.

Goal 8: Reduce Vulnerability of Historic and Cultural Resources

Objectives:

1. Create an inventory of un-reinforced masonry and wood-frame historic landmarks.
2. Develop incentives to encourage retrofitting.
3. Use hazard scenarios and involve the community in risk assessment.
4. Conduct an economic impact analysis.
5. Create venues to encourage community participation in retrofitting.
6. Integrate hazard mitigation planning into other future planning and program efforts: Washington State Downtown Revitalization - Main Street Program.
7. Enter into an Inter-local Agreement with King County.
8. Pursue funding for retrofitting. Ensure that historic landmarks located in Redmond's 100-year floodplain participate in the National Flood Insurance Program and pursue funding from the Flood Mitigation Assistance Program for mitigation projects.

Goal 9: Create Recovery Plan for Redmond Historic District

Objectives

1. Develop a post-disaster recovery plan for how Old Town will rebuild following a major event.
2. Form a task force to develop the plan, assigning a lead agency and public official, and identify all stakeholders.
3. Identify resources, timing, and priorities for funding and technical assistance. Develop justification for items and criteria rationale.
4. Adopt an interim development moratorium so recovery plan alternatives can be considered, while streamlining repair permits and exempting needs for public health and safety provisions.
5. Identify potential properties or sites in or near downtown for temporary housing, business resumption, and debris recycling/dumping, with the awareness that they could remain in place for longer than originally planned.
6. Assess need and consider integrating "Green Infrastructure" design solutions to detain, filter, and/or cool surface runoff in developed areas upstream from the Sammamish River.
7. Ensure Recovery Plan is consistent with community and stakeholder desires for the use of the Burlington ROW land, balancing recovery needs and long-term vision. Competing land use needs should be reviewed post-disaster to ensure priorities are met.
8. Preserve building height limits and any strategic open space by employing existing "Transfer of Development Rights" regulations to shift the density where it best serves needs of the community, natural resources, and transportation efficiency.
9. Actively pursue the vision of Old Town as Redmond's Main Street with pedestrian uses, character, and activity, and pursue specific urban design improvements.
10. Evaluate the relocating of public employees to generate more daytime population and/or pursue an anchor tenant, such as a cinema, to stimulate nighttime activity.

COMMUNITY PROCESS ATTACHMENT GUIDE

Attachment One: Modes of Emergency Management

Attachment Two: Mitigation Work Plan 2003-2005

Attachment Three: Definitions in Emergency Management

Attachment Four: Guidelines of the Cost/Benefit Analysis

Appendix One: Data Documentation Technical Guidance and Data Lists

Appendix Two: Data Documentation Template

Attachment Five: Comprehensive Plan Amendments and Adoption

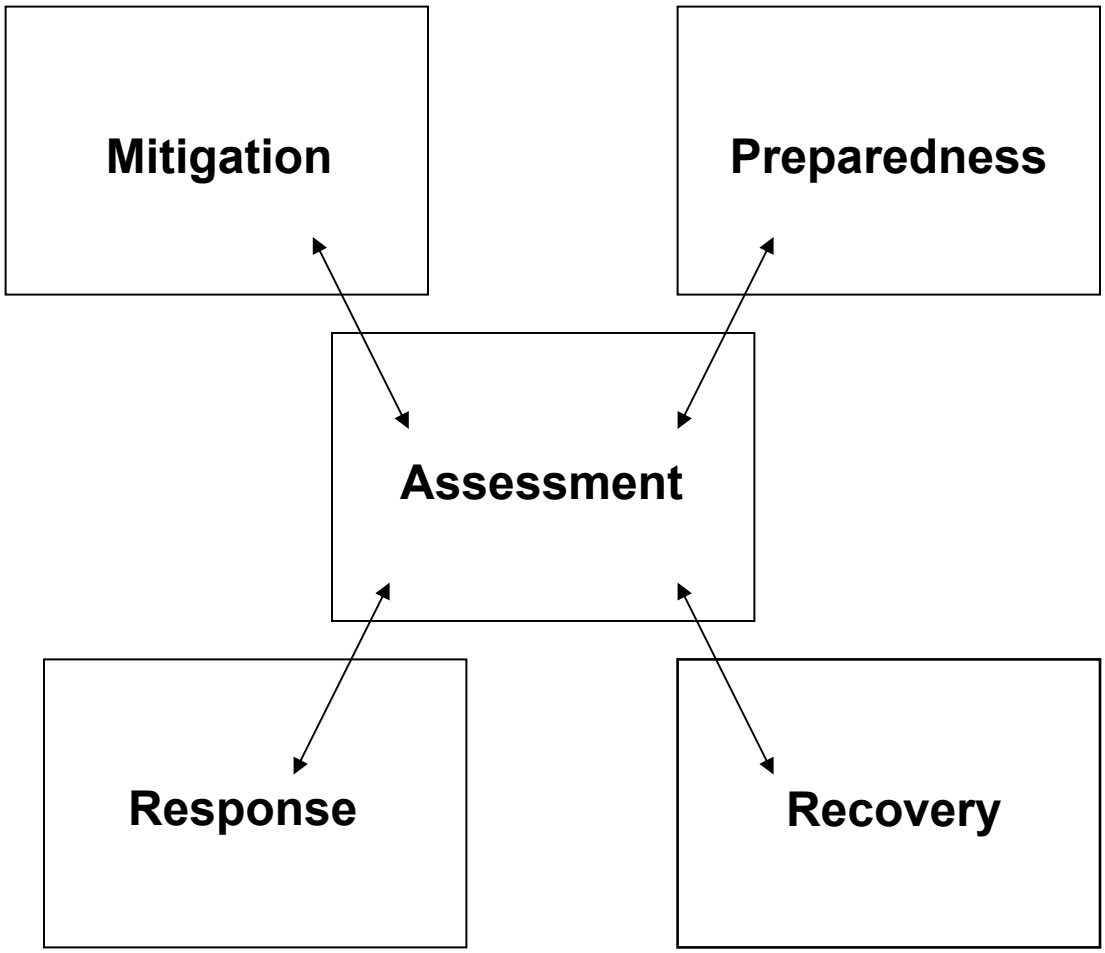
Attachment A: Ordinance #____

Exhibit One: Planning Commission *****RECOMMENDATIONS*****

Attachment Six: Interlocal Agreement

Attachment Seven: Model Recovery and Reconstruction Ordinance

Modes of Emergency Management



Taken from Sanderson, 1990, Sanderson, Lindell 1999

- Common Four Modes plus assessment.
- Emergency Management is a dynamic risk management process operating in five modes.
- The activities performed in each mode are often disjointed from each other and are not necessarily a formal part of any emergency management program.
- The organizations that perform the activities are often multi-organizational and multi-jurisdictional. The group of organizations makes up a virtual emergency management network.
- Assessment is required to improve the outcome of activities in each mode and to improve cross-modal efficiency and network product throughput.

In the literature, “phases” is used interchangeably with “modes.” Modes are used here in order to reduce confusion with response and recovery phases.

Attachment 2

Mitigation Work Plan 2003-2005

Rank	*Activity*	*Description of Activity*	*Estimated*	*Budget Title*	*Cost/Benefit Required*	*Responsible Agency*	*Years*	*Goals*	*Status*
1	Development of Wellhead Protection Ordinance	Study of Redmond aquifers and sensitive areas. Development of regulations for protection of city wells and aquifers.	$500,000	Water Systems Supply Budget	Yes	Public Works	2	Goal #1 Page #11 Goal #5 Page #13	Complete
2	Wellhead 4 Redevelopment	Move Wellhead #4 200 feet east and re-drill. Project designed to guarantee water into the future.	$2,000,000	Capital Investment Projects	Yes	Public Works	2	Goal #1 Page #11 Goal #5 Page #13	Complete
3	Redevelopment of Wellheads 1, 2, & 3	Retrofitting of wells designed to guarantee water into the future.	$3,000,000	Capital Investment Projects	Yes	Public Works	3	Goal #6 Page #14	Awaiting Funding
4	Community Awareness Activities	Public education, presentations, support of Community Organizations Active in Disaster, Citizen Corps, and Ameri Corps. Support of countywide regional mitigation efforts.	$90,000	Emergency Management and Grant Funding	Yes	Fire & Planning Departments	3	Goal #1 Page #11 Goal #2 Page #12 Goal #3 Page #13	Ongoing
5	Olympic Pipeline Setback Plan	Participation in development of plans and guidelines for the plan and city ordinance and Development Guide.	$10,000	Emergency Management and Grant Funding	No	Fire & Planning Departments	1	Goal #6 Page #14	Complete
6	Earthquake Strapping	Tie-down of computer and communications equipment (Non-structural mitigation)	$30,000	Emergency Management Pre-Disaster Mitigation Plan	Yes	Fire Department	1	Goal #1 Page #11 Goal #6 Page #14	Pilot Program In Place

* Reference to strategic and long-range goals as sighted from the Hazard Mitigation Plan

Attachment 2

Mitigation Work Plan 2003-2005

Rank	*Activity*	*Description of Activity*	*Estimated*	*Budget Title*	*Cost/Benefit Required*	*Responsible Agency*	*Years*	*Goals*	*Status*
7	Generator Retrofit for the Public Safety Building	Increase emergency capacity from 50% to 100% in the Public Safety Building and Emergency Operations Center. Rerouted exhaust system for safety purposes.	$110,000	Capital Investment Projects	Yes	Public Works	1	Goal #1 Page #11 Goal #5 Page #13	Complete
8	Alternate EOC and Command Post capabilities	Purchased a Mobile Command Unit and installed communication equipment. Set up power and communication connections at strategic locations for alternate emergency operations centers.	$185,000	Police Department	No	Police Department	1	Goal #1 Page #11	Complete
9	Upgraded GIS Capabilities and Distributed Data Base	Hours assigned to Emergency Management and Hazard Mitigation, Risk Mapping from Management Information Services Department. GIS and distributed database capabilities added to the Emergency Operations Center as a virtual network.	$35,000	Management Information Services and Grant Funding	No	Finance	1	Goal #1 Page #11 Goal #2 Page #12 Goal #7 Page #14	Ongoing
10	Development of Central Receiving	Reduction of terrorism risk through the central processing of mail and packages in a secure location.	$200,000	Capital Investment Projects	Yes	Finance	3	Goal #2 Page #12	Awaiting Funding

* Reference to strategic and long-range goals as sighted from the Hazard Mitigation Plan

Definitions in Emergency Management

The following are definitions of commonly used terms in Emergency Management that are also referred to in the City of Redmond HIVA and Hazard Mitigation Strategy.

Base Flood: A term used in the National Flood Insurance Program to indicate the minimum size flood to be used by a community as a basis for its floodplain management regulations; presently required by regulation to be "that flood which has a one-percent chance of being equaled or exceeded in any given year." Also known as a 100-year flood.

Beaufort Scale: Numerical scale from 0 to 12, indicating wind force.

0-calm	7-strong wind
1-light air	8-gale
2-light breeze	9-strong gale
3-gentle breeze	10-storm
4-moderate breeze	11-violent storm
5-fresh breeze	12-hurricane
6-strong breeze (Reference Center 1998)	

Catastrophe: A disaster that is of such a magnitude that the survival of the community is drawn into question or where the community did not survive the event.

Disaster: Any occurrence that causes damage, ecological disruption, loss of human lives, and deterioration of health and health services on a scale sufficient to warrant an extraordinary response from outside the affected community. (World Health Organization)

Drought: Prolonged absence or marked deficiency of precipitation. (2) Period of abnormally dry weather sufficiently prolonged for the lack of precipitation to cause a serious hydrological imbalance (WMO 1992, 198).

Emergency: An event, expected or unexpected, which places life and/or property in danger and requires an immediate response through the use of routine community resources and procedures (Drabek, Social Dimensions of Disaster Course).

Emergency Assistance: Assistance that may be made available under an emergency declaration. In general, federal support to state and local efforts to save lives, protect property and public health and safety, and lessen or avert the threat of a disaster. Federal emergency assistance may take the form of coordinating all disaster relief assistance (including voluntary assistance) provided by federal agencies, private organizations, and state and local governments.

Emergency Management:

1. Organized analysis, planning, decision-making, and assignment of available resources to mitigate (lessen the effect of or prevent), prepare for, respond to, and recover from the effects of all hazards. The goal of emergency management is to save lives, prevent injuries, and protect property and the environment if an emergency occurs (FEMA 1995, I-6).

2. "A comprehensive system of policies, practices, and procedures designed to protect people and property from the effects of emergencies or disasters. It includes programs, resources, and capabilities to mitigate against, prepare for, respond to, and recover from effects of all hazards" (Michigan DEM 1998, 6).

Emergency Operations Center (EOC): A designated site from which government officials can coordinate disaster response and recovery operations.

Federal Emergency Management Agency (FEMA): Agency created in 1979 to provide a single point of accountability for all federal activities related to disaster mitigation and emergency preparedness, response, and recovery. Federal Emergency Management Agency manages the President's Disaster Relief Fund and coordinates the disaster assistance activities of all federal agencies in the event of a Presidential Disaster Declaration.

Flood:

One-Hundred Year (100-Year) Floodplain: The land area adjoining a river, stream, lake, or ocean which is inundated by the 100-year flood; also referred to as a flood having a one percent chance of occurring in any given year. The 100-year flood is the regulatory (base) flood under the NFIP (FEMA 1990).

Five-Hundred Year Floodplain (or 0.2 percent chance floodplain): That area which includes the base floodplain, which is subject to inundation from a flood having a 0.2 percent chance of being equaled or exceeded in any given year.

Flash Flood: A flood that crests in a short period of time and is often characterized by high velocity flow; often the result of heavy rainfall in a localized area.

Hazard: An event or physical condition that has the potential to cause fatalities, injuries, property damage, infrastructure damage, agricultural loss, damage to the environment, interruption of business, or other types of harm or loss (FEMA 1997).

Hazard Analysis: Involves identifying all of the hazards that potentially threaten a jurisdiction and analyzing them in the context of the jurisdiction to determine the degree of threat that is posed by each (FEMA 1997).

Hazard Assessment: (Sometimes Hazard Analysis/Evaluation) The process of estimating, for defined areas, the probabilities of the occurrence of potentially damaging phenomenon of given magnitudes within a specified period of time. Hazard assessment involves analysis of formal and informal historical records and skilled interpretation of existing topographical, graphical, geological, geomorphologic, hydrological, and land-use maps (Simeon Institute 1998).

Hazard Identification: Hazard Identification locates hazardous areas, often estimates the probability of hazardous events of various magnitudes, and sometimes assesses the separate characteristics of the hazards (i.e., for hurricanes: wind, high water, and wave action) (Godschalk, Kaiser, and Berke, 1998, 98).

Hazard Mitigation: Measures taken in advance of a disaster aimed at decreasing or eliminating its impact on society and environment (U.N. 1992, 41).

Hazard Rating: An adjective description (High, Medium, or Low) of the overall threat posed by a hazard over the next 25 years. It is a subjective estimate of the combination of severity, location, and frequency (probability of occurrence).

High: There is strong potential for a disaster of major proportions during the next 25 years or History suggests the occurrence of multiple disasters of moderate proportions during the next 25 years. The threat is significant enough to warrant major program effort to prepare for, respond to, recover from, and mitigate against this hazard. This hazard should be a major focus of the county's emergency management training and exercise program.

Medium: There is moderate potential for a disaster of less than major proportions during the next 25 years. The threat is great enough to warrant modest effort to prepare for, respond to, recover from, and mitigate against this hazard. This hazard should be included in the county's emergency management training and exercise program.

Low: There is little potential for a disaster during the next 25 years. The threat is such as to warrant no special effort to prepare for, respond to, recover from, or mitigate against this hazard. This hazard need not be specifically addressed in the county's emergency management training and exercise program except as generally dealt with during hazard awareness training.

Hazardous Material (HAZMAT): Any material, which is explosive, flammable, poisonous, corrosive, reactive, or radioactive (or any combination) and requires special care in handling because of the hazards posed to public health, safety, and/or the environment (Firescope 1994).

Human-Made Disasters: Disasters or emergency situations where the principal, direct cause(s) are identifiable human actions, deliberate or otherwise. Apart from "technological" and "ecological" disasters, this mainly involves situations in which civilian populations suffer casualties, losses of property and basic services, and means of livelihood as a result of war or civil strife. For example, human-made disasters/emergencies can be of the rapid or slow onset types, and in the case of internal conflict, can lead to "complex emergencies" as well. “Human-made disaster” acknowledges that all disasters are caused by humans because they have chosen, for whatever reason, to be where natural phenomena occurs that result in adverse impacts of people. This mainly involves situations in which civilian populations suffer casualties, losses of property and basic services, and means of livelihood as a result of war, civil strife, or other conflict (Simeon Institute).

Intensity: Refers to the damage-generating attributes of a hazard. For example, water depth and velocity are commonly used measures of the intensity of a flood. For hurricanes, intensity typically is characterized with the Saffir/Simpson scale, which is based on wind velocity and storm surge depth. Its Richter magnitude (and other similar magnitude scales) gives the absolute size of an earthquake, but the Modified Mercalli Intensity (MMI) Scale describes its effects in specific locations. Earthquake intensity is also ascertained by physical measures such as peak ground acceleration (expressed as a decimal fraction of the force of gravity, i.e., 0.4 g), peak velocity, or spectral response, which characterizes the frequency of the energy content of the seismic wave (Deyle, French, Olshansky, and Paterson 1998, 124).

Mitigation: Activities aimed at eliminating or reducing the occurrence of a disaster and reducing the effects of unavoidable disasters (FEMA, 2001).

Presidential Declaration: Formal declaration by the President that an emergency or major disaster exists, based upon the request for such a declaration by the Governor and with the verification of Federal Emergency Management Agency preliminary damage assessments.

Mitigation: All steps necessary to minimize the potentially adverse effects of the proposed action and to restore, preserve, and enhance natural values of wetlands, or long-term activities to minimize the potentially adverse effects of future disaster in affected areas (FEMA 1996).

Natural Disaster: Any hurricane, tornado, storm, flood, high water, wind-driven water, tidal wave, tsunami, earthquake, volcanic eruption, landslide, mudslide, snowstorm, drought, fire, or other catastrophe in any part of the United States which causes, or which may cause, substantial damage or injury to civilian property or persons (Stafford Act).

Preliminary Damage Assessment (PDA): A process used to determine the impact and magnitude of damage and the resulting unmet needs of individuals, businesses, the public sector, and the community as a whole. Information collected as a result of the PDA process is used by the state as a basis for the Governor's request for federal assistance under the Stafford Act, and by FEMA to document the recommendation made to the President in response to the Governor's request (44 CFR 206.33).

Preparedness:

1. Actions taken in advance of an emergency to develop operational capabilities and facilitate an effective response in the event an emergency occurs. Preparedness measures include, but are not limited to, continuity of government, emergency alert systems, emergency communications, emergency operations centers, emergency operations plans, emergency public information materials, exercise of plans, mutual aid agreements, resource management, training response personnel, and warning systems.

2. Simply preparing for an emergency before it occurs. Obviously, it is important to not just plan but to prepare as well. The key to effective emergency management is being ready to provide a rapid emergency response. Being ready includes training and exercises as well as logistics. Government agencies at all levels have an obligation to prepare themselves and the public for emergencies. Community groups, service providers, businesses, and civic and volunteer groups are all partners in this effort.

Recovery: Activities traditionally associated with providing federal supplemental disaster recovery assistance under a presidential major disaster declaration. These activities usually begin within days after the event and continue after the response activities cease. Recovery includes individual and public assistance programs, which provide temporary housing assistance, grants, and loans to eligible individuals and government entities to recover from the effects of a disaster (FRP Appendix B).

Response: Activities to address the immediate and short-term effects of an emergency or disaster. Response includes immediate actions to save lives, protect property, and meet basic human needs. Based on the requirements of the situation, response assistance will be provided to an affected state under the Federal Response Plan using a partial activation of selected Emergency Support Functions (ESF's) or the full activation of all 12 ESF's to meet the needs of the situation (FRP Appendix B).

Risk: The exposure to the chance of loss. The combination of the probability of an event occurring and the significance of the consequence (impact) of the event occurring (George Washington University, May 2003).

Risk Analysis: The determination of the likelihood of an event occurring (probability) and the consequences of its occurrence (impact) for the purpose of comparing possible risks and making risk management decisions (George Washington University, May 2003).

Risk Assessment: (sometimes Risk Analysis) The combination of vulnerability analysis and risk analysis. The determination and presentation (usually in quantative form) of the potential hazards and the likelihood and the extent of harm that may result from these hazards (George Washington University, May 2003).

Risk Management: "Public risk management is a process used to decide what to do where a risk has been determined to exist. It involves identifying the level of tolerance the community has for a specific risk or set of risks and determines what risk assessment options are acceptable within a social, economic, cultural, and political context. To achieve this, the process must be open since it has to factor in benefits, costs of control, and any statutory or socially approved requirements needed to manage the risk. Hence, it requires communicating and consulting with the public-at-large either directly or through appropriate representation as well as with specialists (Britton 1998, 1).

Risk Reduction: Long-term measures to reduce the scale and/or the duration eventual adverse effects of unavoidable or unpreventable disaster hazards on a society which is at risk, by reducing the vulnerability of its people, structures, services, and economic activities to the impact of known disaster hazards. Typical risk reduction measures include improved building standards, flood plain zoning and land-use planning, crop diversification, and planting windbreaks. The measures are frequently subdivided into "structural" and "non-structural," "active" and "passive" measures. N.B. A number of sources have used "disaster mitigation" in this context, while others have used "disaster prevention" (Simeon Institute 1992).

Recovery: Activity to return vital life support systems to minimum operating standards and long-term activity designed to return life to normal or improved levels, including some form of economic viability. Recovery measures include, but are not limited to, crisis counseling, damage assessment, debris clearance, decontamination, disaster application centers, disaster insurance payments, disaster loans and grants, disaster unemployment assistance, public information, reassessment of emergency plans, reconstruction, temporary housing, and full-scale business resumption.

Response: Actions taken immediately before, during, or directly after an emergency occurs to save lives, minimize damage to property and the environment, and enhance the effectiveness of recovery. Response measures include, but are not limited to, emergency plan activation, emergency alert system activation, emergency instructions to the public, emergency medical assistance, staffing the emergency operations center, public official alerting, reception and care, shelter and evacuation, search and rescue, resource mobilization, and warning systems activation.

Sustainable Development: "In its broader sense, sustainability is defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. In the context of emergency management, this meaning remains, and it is linked to creating places that are less vulnerable to natural and technological hazards and that are resilient to those events. Sustainable hazard management has five components: environmental quality, quality of life, disaster resilience, economic vitality, and inter- and intra-generational equity. Reducing the risk from hazards, reducing losses from disasters and working toward sustainable communities go hand-in-hand" (Britton 1998, 1).

Vulnerability: Describes how exposed or susceptible to damage an asset is. Vulnerability depends on an asset's construction, contents, and the economic value of its functions. Like indirect damages, the vulnerability of one element of the community is often related to the vulnerability of another (FEMA, 2001).

Vulnerability Analysis: A compilation of information that allows for the determination of the possible hazards that may cause harm, taking into account each hazard that has been identified.

Vulnerability Assessment: Vulnerability assessment, the second level of hazard assessment, combines the information from the hazard identification with an inventory of the existing (or planned) property and population exposed to a hazard. It provides information on who and what are vulnerable to a natural hazard within the geographic areas defined by hazard identification. Vulnerability assessment can also estimate damage and casualties that will result from various intensities of the hazard (Deyle et al. 1998, 129).

Vulnerability Rating:

High: The total population, property, commerce, infrastructure, and services of the county are uniformly exposed to the effects of a hazard of potentially great magnitude. In a worse case scenario, there could be a disaster of major to catastrophic proportions.

Medium: The total population, property, commerce, infrastructure, and services of the county are exposed to the effects of a hazard of moderate influence; or

The total population, property, commerce, infrastructure and services of the county are exposed to the effects of a hazard but not all to the same degree; or

An important segment of population, property, commerce, infrastructure, or service is exposed to the effects of a hazard. In a worse case scenario, there could be a disaster of moderate to major, though not catastrophic, proportions.

Low: A limited area or segment of population, property, commerce, infrastructure, or service is exposed to the effects of a hazard. In a worse case scenario, there could be a disaster of minor to moderate proportions.

Guidelines for Benefit-Cost Analysis of PDM Applications

The purpose of this attachment is to provide information about how FEMA will evaluate the cost effectiveness of projects submitted for funding under the Pre-Disaster Mitigation (PDM) grant program. It also explains the requirements for performing Benefit-Cost Analysis (BCA) and providing proper documentation. Section B of this attachment includes sources for additional technical assistance.

This attachment frequently uses the terms BCA and BCR. BCA is a Benefit-Cost Analysis, which is the method by which the future benefits of a mitigation project are determined and compared to its cost. The BCR is the Benefit-Cost Ratio, which is a numerical expression of the cost effectiveness of a project. BCRs over 1.0 have more benefits than costs and are therefore cost effective.

As described in the Guidance for the PDM Program, FEMA will conduct a review of the cost effectiveness of projects submitted for grants. A BCA will be required for all mitigation projects. A National Benefit-Cost Review Panel that will be convened by FEMA will evaluate these BCAs. The panel will evaluate the reasonableness, credibility, and accuracy of all BCAs by reviewing the data provided in the application and the methods used in the analysis, focusing on:

- Technical accuracy
- Supporting documentation
- Source credibility

BCAs that are technically correct and thoroughly documented will be validated and the BCR incorporated directly into the overall National Ranking (see Attachment 1, Grant Guidance FY 2003 Pre-Disaster Mitigation Program – Competitive Grants, DFDA 83.557). Projects where BCAs are inadequately documented or where critical data or sources appear unreasonable will be less competitive, and in some cases may be deemed completely inadequate and removed from funding consideration.

This attachment is divided into the following parts.

A. BCA Requirements

B. Facilitating BCA for Sub-Applicants

C. Identifying Cost Effective Projects

D. Technical Guidance on BCA and Documentation

E. Documentation Guidelines

F. Alternative BCA Methodology for Repetitive Loss Properties

G. Extreme BCRs

Appendix I: Data Documentation Technical Guidance and Data Lists

Appendix II: Data Documentation Template

A. Benefit-Cost Analysis Requirements

The FY 2003 PDM program was established by Congress as a nationally competitive program. The BCR of each mitigation project will be a major factor in the evaluation of PDM projects. Mitigation projects with higher BCRs are more likely to be funded in the nationally competitive PDM program. Mitigation projects with BCRs less than 1.0 will not be eligible for PDM funding.

A BCA is required for all PDM mitigation projects grant applications, including repetitive flood loss properties and substantially damaged flood loss properties. However, BCAs are not required for PDM mitigation planning grant applications.

For the PDM program, the sub-applicant or applicant is required to do the BCA for their mitigation projects as part of the project application. In the past, FEMA sometimes has performed BCAs for its other grant programs as a form of technical assistance to applicants. Because PDM is a competitive program and FEMA does not want to favor any particular proposal or applicant, the Agency will not perform BCAs on behalf of applicants or sub-applicants but will provide a range of technical assistance (discussed later in the attachment).

FEMA's BCAs are governed by guidance from the Office of Management and Budget (OMB). OMB Circular A-94 describes the economic principles and methods by which most federal programs must determine the cost effectiveness (i.e., BCR) of funded projects. OMB A-94 states: *"Analyses should include comprehensive estimates of the expected benefits and costs to society based on established definitions and practices for program and policy evaluation. Social net benefits, and not the benefits and costs to the Federal Government, should be the basis for evaluating government programs or policies that have effects on private citizens or other levels of government."*

Following OMB A-94, the benefits of mitigation projects are counted broadly not narrowly. In simple terms, it is proper to count all of the direct benefits of mitigation projects. The direct benefits are simply the avoided damages, losses, and casualties that may occur in natural disasters. As a general rule of thumb, if a natural disaster results in direct damages, losses, or casualties and a mitigation project avoids or reduces them, then it is acceptable to count these benefits for a FEMA BCA.

The benefits of mitigation projects are simply avoided damages, losses, and casualties. Examples of common benefits include avoided (or reduced):

- Damages to buildings, contents, or infrastructure
- Economic impacts of loss of function of buildings
  - Displacement costs for temporary quarters
  - Loss of public services
  - Loss of net business income
- Economic impacts of loss of function of infrastructure
  - Road or bridge closures
  - Loss of utility services
- Deaths and injuries

OMB guidance excludes some benefits from consideration when conducting a BCA. The most important of these are indirect or "multiplier" effects. For example, long-term changes

in regional economic activity, future employment, or tourism cannot be considered benefits of mitigation projects because they are not directly linked to the project.

For further details of categories of benefits that may or may not be counted see "What is a Benefit?" This document provides standardized benefit categories to count, standardized approaches and standardized data inputs for many common mitigation projects. This document is located on the Mitigation BCA Toolkit CD.

B. Facilitating Benefit-Cost Analysis for Sub-Applicants

Many sub-applicants will be faced with doing BCAs for the first time. Although BCA is a technical process, FEMA has developed software, written materials, and training that simplify the process.

FEMA has a suite of BCA software for a range of major natural hazards: earthquake, fire (wildland/urban interface fires), flood (riverine, coastal A-Zone, Coastal V-Zone), hurricane wind (and typhoon), and tornado.

Sometimes there is not enough technical data available to use the software mentioned above. When this happens, or for other common, smaller-scale hazards or more localized hazards, BCAs can be done with the Frequency Damage Method (i.e., the Riverine Limited Data module), which is applicable to any natural hazard as long as a relationship can be established between how often natural hazard events occur and how much damage and losses occur as a result of the event. This approach can be used for coastal storms, windstorms, freezing, mud/landslides, severe ice storms, snow, tsunami, and volcano hazards.

Applicants and sub-applicants are encouraged to use FEMA software. This will ensure that the calculations and methods are standardized, speeding the evaluation process. Alternative BCA software may also be used but only if the FEMA Regional Office and FEMA Headquarters approve the software in advance. Approvals must be written, dated, and signed. BCAs conducted with non-FEMA software not approved in advance by FEMA will be removed from funding consideration for the FY 2003 PDM program.

FEMA has prepared a Mitigation BCA Toolkit CD. This CD includes all of the FEMA BCA software, technical manuals, BC training courses, and other supporting documentation and guidance. The Mitigation BCA Toolkit CD is available free from FEMA regional offices or via the BC Hotline (bchotline@urscorp.com or (301) 670-3399 x710). The BC Hotline will have a toll free number starting July 31, 2003, at (866) 222-3580. The BC Hotline is also available to provide BCA software, technical manuals, and other BCA references as well as to provide technical support for BCA.

For further technical assistance, applicants or sub-applicants may contact their State Mitigation Office, the FEMA Regional Office, or the BC Hotline. FEMA and the BC Hotline provide technical assistance regarding how to perform a BCA but will not perform the actual BCA. If the sub-applicant is re-submitting a project for which FEMA or a state performed the BCA in the past, the applicant and sub-applicant certify that they accept the BCA as their own by submitting it as part of their application. Applicants and sub-applicants are encouraged to revisit those analyses to ensure they demonstrate maximum project benefits.

C. Identifying Cost Effective Mitigation Projects

Applicants and sub-applicants are encouraged to consider the idea of "risk" when identifying and analyzing mitigation projects for the PDM program. Risk is simply the threat to the built environment (buildings and infrastructure) and people (casualties) expressed in terms of dollars.

Risk depends both on the frequency and severity of natural hazards and on the vulnerability of the built environment and people. The highest risk situations have a combination of high hazard, high vulnerability, and high value of inventory (buildings, infrastructure, people) exposed to the hazard. This concept of risk is summarized in the figure below (using flood as an example):

HAZARD & RISK

While it is generally true that high-risk situations have the highest potential benefits, the cost effectiveness of mitigation projects also depends directly on how much they cost. The BCR (which will be used to rank projects) is a *comparison* of benefits to costs. Even in situations where risk appears relatively small, such as a rural culvert washing out every year, an inexpensive mitigation project may be highly cost effective. Projects that mitigate "big" risk are not necessarily more cost effective.

D. Technical Guidance on Benefit-Cost Analyses and Documentation

It is the applicant and sub-applicant's responsibility to provide a BCA that is reasonable, credible, and well documented. A National Benefit-Cost Review Panel (see Section F) will be convened to rank all PDM projects by BCR. The Review Panel evaluation and ranking will be based solely on documentation provided in the project application. Thus, it is essential that every application provide full documentation of the BCA.

A well-documented BCA means that knowledgeable subject matter experts (BC analysts) should be able to recreate the sub-applicant's BCA from the supporting documentation, from the project application, without any additional explanation.

Each application must include the following essential documentation.

1. **A narrative describing the details of the mitigation project, including what the hazard is (i.e., flood), what damages and losses it is causing, and how the mitigation project addresses the problem.**
2. **Documentation of the mitigation project scope and cost, including engineering cost estimates whenever possible.**
3. **An electronic or paper copy of the full benefit-cost analysis (an electronic copy is strongly encouraged).**
4. **Full documentation of each data entry that affects the numerical BCR (see further details below). In the FEMA software, green and blue data entry cells represent entries that affect the numerical BCR. Thus, when using the FEMA software, documentation should be provided for the source and validity of each green and blue data entry cell input into the BCA software.**

When evaluating projects, FEMA will consider the accuracy of data, completeness of documentation, and the credibility of data sources (see Appendix I). In a nutshell, the numerical values, sources, and assumptions in a BCA must make sense and be well documented.

The following technical guidance is intended to help applicants and sub-applicants provide BCAs that meet the criteria of reasonable, credible, and well documented.

1. Use the FEMA BCA software whenever possible.
2. An application's project scope should be carefully explained with enough detail to understand exactly which area/buildings/people are affected by the project and what the project will do to mitigate risk. For example, "acquire and demolish 18 houses on Main Street" is a clear statement of a mitigation project when accompanied by more details (addresses, building types, square footages, building values, first floor elevations, etc.). On the other hand, "implement measures to reduce flooding on Main Street" is not detailed enough.
3. Project costs should be fully documented and supported with cost estimates from appropriate sources. For BCA, the project cost is always the total project cost not simply the FEMA share.
4. BCA is a net present value calculation that takes into account the useful life of mitigation projects and the time value of money. For all FEMA projects, the OMB-mandated discount rate of 7% must be used for performing BCAs. In addition, a useful life appropriate for the specific mitigation project must be used for all BCAs. For guidance on project useful lifetimes, see "What is a Benefit?" and other guidance on the Mitigation BCA Toolkit CD or contact your FEMA Regional Office or the BC Hotline.
5. Each data input for BCA that affects the numerical BCR must be fully and carefully documented. It is recommended to use standard FEMA methodology and default data when it applies.
    a. Some data inputs may be based on national or typical data, and use of such data is encouraged when applicable to specific projects. Examples of such data include the damage data percentages in FEMA BCA software and typical values for economic impacts of road and bridge closures and loss of function of utilities (reference: *What is a Benefit?*).

b. Many data inputs are project specific and must be documented by local data. Examples of such data include building types, building areas, building values, first floor elevations, values of public service, and occupancy.

E. Data Documentation Guidelines

It is important to document all of the data in a BCA that affects the numerical BCR. Documentation must be complete enough so the Review Panel may evaluate the project and the accuracy of the data, using only the information in the project application file. For example, a statement that "damages in the flood of April 1, 2003 totaled about $2,000,000 in Smalltown" is not sufficient. Rather, documentation should describe where the damage occurred, with breakdowns of damages to buildings, contents, infrastructure, people, etc., and enough detail to evaluate the accuracy of the damage estimate.

Documentation must include hazard data (flood, earthquake, etc.), building or infrastructure damage data, and information supporting economic losses and casualties.

Data from FEMA BC software and values from FEMA guidance such as "What is a Benefit?" will be accepted as credible. Data from recognized sources such as the US Geological Survey (USGS), National Oceanic and Atmospheric Administration (NOAA), state agencies, and academic organizations have a high degree of credibility. Where data is purely local, supporting documentation from an engineer or other qualified source improves the credibility and robustness of documentation. Any deviations from standard procedures, methods, techniques, or guidance must be thoroughly explained and documented. In all cases, applications should include written backup for the data that is used (copies of web pages, copies of data from Flood Insurance Studies, etc. Appendix I contains lists of important BCA data inputs for mitigation projects addressing the major hazards.

Appendix II contains a sample data documentation template for flood hazard mitigation projects. The template defines the data, lists sources, and describes what documentation is appropriate. The Mitigation BCA Toolkit CD has further examples and blank hazard-specific templates for use by Applicants or Sub-Applicants. The templates should be used to ensure that data, documentation and source credibility are adequate for FEMA's review.

F. Alternative BCA Method for Repetitive Flood Loss Properties

FEMA is introducing a pilot program that allows a simplified, BCA methodology for certain repetitively flooded properties insured under the National Flood Insurance Program (NFIP). These are properties that have experienced four or more insured flood losses or have the highest severity of flooding (i.e., cumulative losses paid exceeds the property value). There are approximately 10,000 such properties, which represent about one-quarter of one percent of all NFIP policies. This alternative methodology may only be applied to projects meeting the following criteria.

- Projects that address pilot NFIP repetitive loss properties on the list provided with this memorandum
- Projects that are designed to accomplish property acquisition/demolition, structure relocation, or structure elevation
- For structural elevation projects, each structure must provide a minimum one-foot of freeboard above the base flood elevation (BFE) or higher elevation as needed to

provide 100-year flood protection plus one foot of freeboard. More stringent state or local requirements must be met where applicable.

For these pilot NFIP repetitive loss structures, FEMA has calculated "Potential Future Damages Avoided." For acquisition, relocation, or elevation projects for properties on this list, a BCR may be calculated simply as:

Potential Future Avoided Damages / Total Project Cost = BCR.

This analysis considers only insured losses (building and contents damages). Other economic impacts (displacement costs for temporary housing and uninsured losses) are not included. If desired, a traditional BCA can be conducted to consider only benefits other than avoided building and contents damages. Then the total benefits are the sum of the Potential Future Avoided Damages, and the additional benefits and the BCR may be calculated simply as:

(Potential Future Avoided Damages + Additional Benefits) / Total Project Cost = BCR.

G. Extreme BCRs

There are no realistic hazard mitigation projects with extreme BCRs of 100's or 1000's. To have such extreme BCRs, the (average annual) damages would be many times the replacement value of the building. Such situations would be impossible to tolerate economically, and/or the facility would have to be damaged so many times per year that repairs would be literally continuous and endless.

Based on experience, we have found that many reported BCRs of 10 to 100 are also incorrect, based on illogical or faulty data or analyses. There are a few mitigation projects where BCRs may approach or exceed 10, but these are rare and are most often where a non-structural mitigation project protects something of much higher value. Examples may include storm shutters for critical facilities in hurricane prone areas or non-structural earthquake projects that protect very high value or critical facilities. Therefore, PDM projects submitted with extremely high BCRs will be reviewed very carefully.

Appendix One
Data Documentation Technical Guidance and Data Lists

This appendix contains additional technical information about BCA and hazard specific lists of data parameters for BCA.

As discussed in the BCA sections of the PDM Guidance, all BCAs submitted by applicants or sub-applicants will be evaluated by a National Review Panel for three general qualities.

- Technical Accuracy
- Supporting Documentation
- Source Credibility

All input data that affects the numerical BCR must be thoroughly documented by the applicant or sub-applicant in the project application. Evaluation and ranking will be based solely on information provided in the application.

There are several evaluation criteria that apply to every mitigation project, for every type of hazard.

1. Use of FEMA BCA software is strongly encouraged. Non-FEMA software may be used only if both the FEMA Regional Office and FEMA Headquarters approve the software in advance and in writing.
2. The OMB-mandated discount rate of 7% must be used for all BCAs.
3. Mitigation project scope must be explained in sufficient detail so that evaluators may understand fully what the hazard is (i.e., flood), what damages and losses it is causing, how the project works to mitigate the identified problems, and how effective the project will be in reducing future damages and losses. Acquisition/relocation is the only common mitigation project that is 100% effective in avoiding future damages and losses. For all other types of projects, documentation must be provided to determine how effective the project will be in reducing damages after mitigation at various levels of hazard severity or frequency.
4. Project costs must be fully documented and supported with engineering cost estimates whenever possible. For BCA, the project cost is always the total project cost, not the FEMA share. If annual maintenance costs are necessary for a mitigation project to be effective, such costs must be included and documented. Similarly, if temporary relocation of occupants is necessary in order to complete a mitigation project (i.e., seismic structural retrofit of building), then such costs must be included and documented.
5. Project useful life must be consistent with FEMA guidance and practice. See "*What is a Benefit?*" guidance and the technical manuals for the FEMA BCA software or consult FEMA Regional Offices or the BC Hotline for guidance on useful life for specific mitigation projects.
6. The benefits of avoiding or reducing casualties may be significant for some types of projects (i.e., many seismic projects). However, for many common types of mitigation projects, such as flood projects other than flash flooding or dam failure, life safety benefits are often negligible or non-existent. Any BCA that claims life safety benefits must carefully and thoroughly document the direct connection between the proposed mitigation project and reductions in expected future deaths and injuries. For FEMA statistical values for injuries and deaths, see "*What is a Benefit?*" guidance.

7. Many of the FEMA BCA modules contain typical or default data. Use of such data will be accepted as long as the data is applicable to the specific mitigation project; however, applicants and sub-applicants must understand the applicability of the typical or default data. For example, use of residential depth-damage percentages for infrastructure or a wastewater treatment plant or use of seismic damage percentages for buildings for non-structural or infrastructure projects would be incorrect and would impact the review and evaluation process.

The number and types of data inputs for BCA vary depending on the hazard being addressed, the type of mitigation project, and other factors. The Common Data Inputs for BCA section of this attachment summarize the major data inputs required for common mitigation projects for the most common hazards.

The relative importance of each data input on the BCR varies significantly from project to project. For example, life safety benefits (avoided deaths and injuries) may be very important for some types of mitigation projects (i.e., seismic structural retrofits of buildings) but may be negligible or non-existent for other types of projects. Data inputs are listed in approximate order of importance, but applicants and sub-applicants must realize that the actual order of importance varies from project to project.

For hazards that are addressed by less-common mitigation projects (Example: utility protective measures for ice storms), the specific data inputs required for BCA may vary from those in the Common Data Inputs for BCA section of this attachment. In such cases, applicants and sub-applicants are responsible for ensuring that all data inputs for their specific mitigation projects are thoroughly documented, regardless of whether or not the data inputs are included on the following data lists.

Many of the data items listed below have specific “terms of art” meaning in BCA. Applicants, sub-applicants, and BC analysts are encouraged to obtain technical materials, take training when available, and contact the BC Hotline at bchotline@urscorp.com or by phone at (301) 670-3399 x710 (toll free starting July 31, 2003 at (866) 222-3580), or FEMA Regional Office if they need assistance with understanding these data terms or with any other aspects of BCA.

Common Data Inputs for BCA

Frequency-Damage Analysis Methodology (Flood and Most Other Hazards)

The frequency-damage module (Riverine Limited Data Module) was designed for BCA of flood mitigation projects for locations without quantitative flood hazard data (i.e., outside of mapped flood plains) and/or without first floor elevation data. This module can also be used for any other hazard (i.e., ice storms, snow, windstorms) for which frequency-damage relationships can be derived from historical damage data and/or engineering judgment.

The frequency-damage method should never be used for BCA of seismic, hurricane wind, or tornado mitigation projects. For these hazards, national quantitative hazard data exists, and thus, much more accurate BCAs can be conducted using the hazard specific BCA software for earthquakes, hurricane wind, or tornadoes. Common data inputs include:

1. Documentation of event frequency.
2. Pre-mitigation damages and losses in high frequency events (1- to 10-year recurrence interval).
3. Pre-mitigation damages and losses in moderate frequency events (10- to 50-year recurrence interval).
4. Effectiveness of mitigation project – to what level of event does the project avoid or reduce future damages?
5. All pre-mitigation damages or losses with high value.
6. All estimates of deaths and injuries.
7. Pre-mitigation damages in losses in low frequency events (>50-year recurrence interval).

Engineering Data Analysis Methodology
Flood Hazards (Riverine, Coastal A-Zone and Coastal V-Zone Full Data Modules)

The engineering data analysis method uses quantitative data to determine the frequency and severity of flood events and engineering data to calculate damages and losses before and after mitigation. Common data inputs include:

1. Finished floor elevation.
2. Flood elevation data (typically 10-, 50-, 100- and 500-year).
3. Flood discharge data (Riverine only).
4. Building type.
5. Building replacement value.
6. Depth-damage functions (if not FEMA software typical values).
7. Building damage percentage resulting in demolition.
8. Contents replacement value.
9. Functional downtime and value of loss of service (especially if large fraction of benefits).
10. Continuity premium for loss of public services (if used).
11. Displacement times and costs (if not FEMA typical values).
12. Building area.

13. Net business income (if commercial property).

Engineering Data Analysis Methodology
Seismic Hazards (Seismic Full Data Module: Structural Mitigation Projects for Buildings)

Note: Several important aspects of the Seismic Full Data BCA Module are outdated. See the Mitigation BCA Toolkit for essential updates for seismic hazard data, seismic damage functions, casualty rates, and other critical inputs for BCA. **Do not use the Seismic Full Data Module without incorporating these updates.** Common data inputs include:

1. Seismic hazard data (see Mitigation BCA Toolkit).
2. Soil type (see Mitigation BCA Toolkit).
3. Building structural system type.
4. Building replacement value.
5. Seismic-damage functions (if not FEMA software typical values – see Mitigation BCA Toolkit).
6. Building damage percentage resulting in demolition.
7. Building occupancy.
8. Casualty rate estimates (see Mitigation BCA toolkit).
9. Contents replacement value.
10. Functional downtime and value of loss of service (especially if large fraction of benefits).
11. Continuity premium for loss of public services (if used).
12. Displacement times (if not FEMA typical values) and costs.
13. Building area.
14. Net business income (if commercial property).

<u>Notes on other Types of Seismic Hazard Mitigation Projects</u>

The Seismic Full Data Module should not be used for non-structural mitigation projects such as bracing or anchoring contents, equipment, or for projects addressing non-structural building elements such as ceilings or windows. For such projects, the Non-Structural Seismic Module should be used (see Mitigation BCA Toolkit). The Non-Structural Module contains BCA templates and typical data for many types of common non-structural projects. The specific data required varies from project to project. Data documentation requirements are generally similar to those for buildings. For non-structural projects, documentation should be provided for all data entries applicable to the specific type of mitigation project.

Engineering Data Analysis Methodology
Hurricane Wind Hazards (Hurricane Wind Full Data Module)

1. Wind hazard data
2. Distance inland
3. Building type
4. Building replacement value

5. Wind-damage functions (if not FEMA software typical values)
6. Effectiveness of mitigation project in reducing damages
7. Building damage percentage resulting in demolition
8. Contents replacement value
9. Functional downtime and value of loss of service (especially if large fraction of benefits)
10. Continuity premium for loss of public services (if used)
11. Displacement times (if not FEMA typical values) and costs
12. Building area
13. Net business income (if commercial property)

Wildland/Urban Interface Fire Mitigation Projects
(Wildland Fire BCA Module)

1. Fire hazard data – standard method
   a. Sample area of similar fire hazard
   b. Total acres burned in sample area over time period
   c. Number of years in time period
2. Fire hazard data – user-defined burn interval – full documentation is extremely important for use of user-defined burn interval
3. Damages and losses before mitigation: All of this data must be ONLY for the specific geographic area directly affected by the mitigation project
   a. Building value
   b. Contents value
   c. Infrastructure
   d. Timber value
   e. Fire suppression costs
   f. Other
   g. Number of residents
   h. Annual death rate per 1,000,000
4. Effectiveness of mitigation measure (percent reduction in damages and losses) – Full documentation is extremely important for this data entry. Consultation with fire service professional is highly recommended.

Standard Analysis Methodology
Tornado Hazards

1. Building type
2. Shelter design wind speed
3. Occupancy [numbers vs. time]
4. Injury and mortality percentages [curves], if default not used
5. Building dimensions
6. Building damage percentage resulting in demolition
7. Shelter floor area

Appendix Two
Data Documentation Template

Flood Mitigation (Riverine, Coastal A-Zone, Coastal V-Zone)
Engineering Data Analysis Methodology [Full Data BCA Modules]

Data Type	Value	Description	Documentation	Source
Finished floor elevation [FFE]	Expressed in feet above mean sea level [MSL]	• The FFE is the elevation of the top of the finished flooring of the lowest floor. • The elevation should be measured at the first floor *above grade*, not at the basement level. The FFE is a primary determinant of flood risk.	• Survey, Elevation Certificate, other formal records. • If estimated, include a description of how derived and copies of all pertinent references, such as topographic maps, surveys, photographs of mud lines, etc. • If estimated, indicate who performed the estimate.	Engineers, Licensed/Registered Surveyors, Certified Floodplain Managers, local floodplain administrators, insurance agents, planners with floodplain experience.
Flood Elevation Data	Elevations of 10-, 50-, 100- and 500-year floods	Specific values read from flood profile graph (in the Flood Insurance Study) for the project location along the reach of the flood source (river).	Provide copy of flood profile graph and location of project site along the bottom axis of the profile.	FEMA Flood Insurance Study or local flood study.
Flood Discharge Data	Stream discharges (volumes) for 10-, 50-, 100-, and 500-year floods	The volume of water that will flow down a river or stream during a specified flood. Discharge is usually measured in cubic feet per second.	Provide copy of discharge table	FEMA Flood Insurance Study or local flood study.

Data Type	Value	Description	Documentation	Source
Building type	Selection of one of the building types	• How many stories and whether or not there is a basement. • Building type is a major determinant of anticipated damage from floods.	Tax records, appraisals, letters from homeowners, photographs, etc.	Homeowner, local building inspection department, local tax assessor's office, title documents, etc.
Building replacement value	Expressed as dollars per square foot	• The cost for labor and materials to build a similar structure in the same place. • A key determinant of the amount of damage from future floods.	Letter from construction or contracting firm, letter from local building inspection department, photocopy of page or pages from standard cost reference manuals.	• Local building inspector, contractor, builder, construction company, architect, or building engineer. • Standard references such as Marshall & Swift Residential Cost Handbook, Means Square Foot Cost Guide, etc.
Depth-damage function	Expressed as the percent damage of the building replacement value at each flood depth.	• Estimate of building damages at each flood depth. • Relationship between flooding depth in feet and damages in dollars; as the flood depth increases, damages will typically increase.	• If typical values in FEMA software are used, then provide printout of software. • If user-determined values are used, provide full documentation of reasons for differences from FEMA typical values.	• FEMA typical values in software or • Estimates based on historical losses and engineering judgment.

Data Type	Value	Description	Documentation	Source
Building damage (percentage) that would result in demolition	Percentage of building replacement value	• FEMA standard value is 50%. • Low cost or poorly maintained structures may have lower values; structures of historical or other importance may have higher values. • Lower demolition percentages result in higher BCRs.	• No documentation required if standard value used. • Provide documentation and the basis of the estimate for values other than 50%.	Values other than 50% should include consultation with real estate appraiser, economist, local building inspector, contractor, builder, construction company, architect, building engineer, planners, etc.
Contents value	Expressed as dollars	• The cost to replace the contents of a structure. • Contents damage includes items like furniture, office equipment, etc. • Contents do not include items that are permanent parts of the building, such as electrical and plumbing systems. • FEMA standard for residential structures is 30% of the replacement value of the structure.	• 30% value for residential structures: no documentation required. • For other values for residential buildings and for non-residential structures, provide detailed descriptions of contents, value, and the means by which value was assessed.	• No source required if a residential structure and FEMA standard is used. • Otherwise, review insurance records, appraisals, purchase receipts, and estimates based on current market prices for similar contents.
Functional Downtime	Days, increases with flood depth (building percent damage)	The time period for which public or commercial services are lost from a building.	• For ordinary buildings, typical values in FEMA software. • For critical buildings, use "*What is a Benefit?*" guidance.	• No local source required if FEMA typical values are used. • Developing non-standard values may involve working with organization or agency providing service.

Data Type	Value	Description	Documentation	Source
Value of loss of service	Dollar value of loss of public services	For public services, daily value of service is estimated by the daily cost of providing service.	• Documentation of annual operating budget for public facility. • For critical facilities, see "*What is a Benefit?"* guidance.	• Agency providing service.
Continuity premium	Multiplier on ordinary value of service	Applies only to services critical to immediate disaster response and recovery (Police, Fire, etc.)	• No documentation required if FEMA standard values are used. • Exception to standard values requires detailed explanation of source used and method applied.	• See "*What is a Benefit?*" guidance for standard values. • Developing non-standard values may involve working with organization or agency providing service.
Displacement costs	Expressed as dollars per square foot per month, and one time and monthly costs.	• The costs borne by occupants during the time when a structure is flooded and they are unable to occupy it. • Costs may include rent for alternative living spaces, rent for storage space, additional commuting time, additional day care, unpaid time off work, rental trucks, etc. • All these may be estimated when supported by credible documentation and sources.	• Alternative living space documented by copies of rental costs from realtors, leasing agents, or newspapers, among others. • Rental for storage spaces may be supported by copies of advertising, or records of contacts with rental companies. • Extra commuting costs and day care may be estimated as long as the estimation methodology is explained.	• Photocopies of ads for rental spaces in the community, records of phone contacts with rental agencies, or receipts from similar rentals. • For residential properties, typical displacement costs are $0.50 to $1.00 per square foot per month. Typical other monthly costs and one-time costs are $500 each. • Use standard figures where possible [i.e. 34.5 cents per mile for additional commute].

Data Type	Value	Description	Documentation	Source
Displacement time	Days, increases with flood depth (building percent damage)	The time period for which occupants are expected to be displaced to temporary quarters due to flood damage	• No documentation required if FEMA standard values are used for residential and other ordinary buildings use typical values. • Provide data derivation method for techniques used.	See "*What is a Benefit?*" guidance for residential and critical facilities.
Building floor area	Expressed in square feet	The total enclosed area in the structure. Used in conjunction with replacement value to determine anticipated flood damages in various potential events.	Various forms are acceptable, including tax records, appraisals, surveys, estimates from photographs, etc.	• Local tax office or appraisers office, surveyor, title documents with building footprint, etc. • Homeowner estimates or measured drawings accompanied by photograph, etc.
Loss of business income	Net (not gross) business income	For commercial facilities, loss of net business income is the measure of loss of function when damage results in closure of the facility.	No documentation required if FEMA standard values are used.	The FEMA HAZUS earthquake loss estimation software has typical values for many classes of business - applicable to all hazards.

V.2

MEMO TO: City Council

FROM: Rosemarie Ives, Mayor

DATE: September 16, 2003

SUBJECT: **ORDINANCE: ADOPTION OF COMPREHENSIVE PLAN AMENDMENTS TO ADD AN UPDATED VISION, GOALS AND FRAMEWORK POLICIES CHAPTER AND TO REMOVE EXISTING FRAMEWORK POLICIES AND TEXT**

I. RECOMMENDED ACTION

By motion, adopt an ordinance approving the Planning Commission's recommended amendment for an updated Vision, Goals and Framework Policies Chapter of the Comprehensive Plan, with the clarifications and refinements described below under Alternative A.

II. DEPARTMENT CONTACT PERSONS

Roberta Lewandowski, Director, Planning and Community Development, 425-556-2447
Rob Odle, Policy Planning Manager, 425-556-2417
Lori Peckol, Principal Planner, 425-556-2411

III. DESCRIPTION/BACKGROUND

The Vision, Goals and Framework Policies Chapter is the first to be updated as part of the 2003-2004 Comprehensive Plan Amendment. This element is being updated to reflect the preliminary preferred growth strategy selected by City Council in January 2003, subsequent citizen input through several public meetings, and issues and opportunities facing the City.

Major updates in the recommendation compared to the existing framework policies include the following:

- Brings all the framework policies together in the Goals and Vision element to provide in one location the 20-year community vision and key policies to implement the vision. Includes minor revisions to eliminate redundancy and improve clarity.

- Fills in gaps in the set of framework policies by adding policies that provide a clear basis for several existing elements, such as Annexation and Intergovernmental Planning, and includes policies that provide direction for the future development of new Comprehensive Plan elements concerning Community Character and Citizen Participation/Evaluation.

- Includes the housing and employment targets of the preliminary preferred growth strategy.

- Updates the housing policies to reflect the preliminary preferred growth strategy selected by City Council and clarifies that Redmond is part of a larger sub-area that provides housing choices for people working in the area.

- Increases the emphasis on proactively working with public and private interests, such as business, organizations or agencies, to implement the Comprehensive Plan, as well as the importance of establishing and supporting a culture of dialogue and partnership.

- Updates the transportation framework policies to reflect feedback from people at recent workshops, discussions among Planning Commissioners and City Council, and advice from the City's transportation consultant on issues and opportunities facing Redmond that will be expanded upon in 2004 as part of the Transportation Master Plan.

The next elements in the Planning Commission's work plan for the Comprehensive Plan update are Downtown, Housing, Land Use and Transportation. Planning Commission work on the remaining elements of the Comprehensive Plan will occur in 2004. Because this process is iterative, additional refinements to the vision, goals and framework policies may be needed with completion of further amendments to the Comprehensive Plan.

IV. IMPACT

Service Delivery and Fiscal Impact: The Vision, Goals and Framework Policies Chapter further defines the basis and direction for additional amendments planned for adoption later this year and next. Together with the preliminary preferred growth strategy, it provides direction for determining needs for facilities and services and how these needs should be met. As directed by the City Council through Resolution No. 1066, staff will also include a highest growth scenario as part of environmental review for comparison purposes in considering potential long-term facility and service needs.

V. ALTERNATIVES

A. Adopt the Planning Commission recommended amendment with modifications identified by City Council members at the August 26 study session. The Planning Commission's recommended amendment for an updated Vision, Goals and Framework Policies Chapter was discussed by the City Council in August. It reflects the preliminary preferred growth strategy selected by City Council and significant public input through several community and neighborhood meetings, as well as meetings of the Greater Redmond Chamber of Commerce Land Use and Transportation Subcommittees. In addition, the recommended amendment:

- Updates Redmond's Comprehensive Plan to reflect current issues, direction, opportunities and goals.

- Brings all the framework policies together to provide in one location the 20-year community vision and key policies to implement the vision.

- Eliminates redundancies among the existing framework policies.

- Provides the basis and direction for further updates to the Redmond Comprehensive Plan and Community Development Guide.

So far, Council members have identified several potential refinements and clarifications to the recommended amendment, including clarifications concerning references to transit service and transportation alternatives, leaving a placeholder for one or more framework policies concerning Overlake, increasing the emphasis on non-regulatory approaches to environmental conservation, referencing Redmond's growing ethnic diversity, and clarifying references to business growth in neighborhoods. These potential modifications would be consistent with the Planning Commission's intent and citizen comments from public meetings. These potential modifications are shown in underline and strike-out in Exhibit 1 to Attachment A. The changes are also summarized in Attachment B. Typos and other corrections identified by Council members have already been included and are not shown in legislative format.

B. <u>Adopt the Planning Commission recommended amendment</u>. As described above under Alternative A, the Planning Commission's recommended amendment is an important and necessary update to the Vision, Goals and Framework Policies Chapter. However, it does not contain the modifications identified by Council members, which would further strengthen and clarify the proposed amendment. Staff recommends Alternative A based on the potential modifications identified by Council members so far. Other modifications, if proposed, that are departures from the Planning Commission's intent and citizen comment would likely affect the goal of retaining Redmond's character while accommodating growth.

VI. TIME CONSTRAINTS

The Growth Management Act requires that cities and counties planning under the Act must review and update comprehensive plans by December 2004. There are a number of updates needed to Redmond's Comprehensive Plan and Development Guide, including updates to the housing and transportation chapters, facility plans, and critical areas ordinances. Adoption of an updated Vision, Goals and Framework Policies Chapter is an important step in the update

process and prompt action is needed to enable completion of all updates in compliance with the deadline.

VII. LIST OF ATTACHMENTS

Attachment A: Ordinance

- **Exhibit 1:** Planning Commission Recommended Comprehensive Plan Sections for Adoption, with Potential Modifications Identified by City Council members
- **Exhibit 2:** Planning Commission Recommended Comprehensive Plan Sections for Repeal

Attachment B: Summary of City Council Comments and Staff Responses

/s/ 9/3/03
Roberta Lewandowski, Planning Director Date

Approved for Council Agenda: /s/ 9/10/03
Rosemarie Ives, Mayor Date

ATTACHMENT A

ORDINANCE NO. _____

AN ORDINANCE OF THE CITY OF REDMOND, WASHINGTON, AMENDING THE REDMOND MUNICIPAL CODE AND THE REDMOND COMMUNITY DEVELOPMENT GUIDE TO ADOPT AN UPDATED VISION, GOALS AND FRAMEWORK POLICIES CHAPTER, TO REMOVE EXSITING FRAMEWORK POLICIES AND TEXT FROM SEVERAL CHAPTERS (DGA 02-013) AND ESTABLISHING AN EFFECTIVE DATE.

WHEREAS, pursuant to the Growth Management Act, the City of Redmond must update its Comprehensive Plan by December 2004; and

WHEREAS, through Resolution No. 1066, the City Council selected Modified Draft Alternative 3 as the preliminary preferred growth strategy and basis for further work to update Redmond's Comprehensive Plan and the Redmond Community Development Guide, and directed staff and the Planning Commission to carry out a work plan to further evaluate and implement the preliminary preferred growth strategy as soon as practicable; and

WHEREAS, in 2003, the City has held two major community meetings to seek citizen participation in the Comprehensive Plan update and has held meetings in the Downtown, SE Redmond, North Redmond, Education Hill, Grass Lawn, and Viewpoint neighborhoods to seek ideas from citizens at a neighborhood specific level concerning a variety of Comprehensive Plan issues; and

WHEREAS, the proposed Vision, Goals and Framework Policies Chapter reflects the preliminary preferred growth strategy selected by City Council, public input through several public meetings, and issues and opportunities facing Redmond; and

WHEREAS, state agencies received 60-day notice of Redmond's proposed Comprehensive Plan amendments and provided no comment; and

WHEREAS, a State Environmental Policy Act Checklist was prepared and a Determination of Non-Significance was issued July 23, 2003, for the proposed Comprehensive Plan amendments; and

WHEREAS, the Planning Commission has conducted a public hearing to receive public comments on the proposed Comprehensive Plan amendments; and

WHEREAS, the City Council has conducted public meetings to review the Comprehensive Plan amendments and allow for public comment therefore; and

WHEREAS, the proposed Vision, Goals and Framework Policies Chapter provides the basis and direction for further updates to the Redmond Comprehensive Plan and the Redmond Community Development Guide; and

WHEREAS, the City of Redmond desires to adopt an updated Vision, Goals and Framework Policies Chapter that communicates the 20-year community vision and key policies to implement the vision, NOW, THEREFORE,

THE CITY COUNCIL OF THE CITY OF REDMOND, WASHINGTON, DO ORDAIN AS FOLLOWS:

Section 1. Findings and Conclusions. After carefully reviewing the record and considering the evidence and arguments in the record and at public meetings, the City Council hereby adopts the findings, analysis and conclusions in the Planning Commission Report dated August 19, 2003.

Section 2. Amendment of Redmond Comprehensive Plan. The Redmond Comprehensive Plan is hereby amended to add the text, policies and other provisions as set forth in Exhibit 1, incorporated herein by this reference as if set forth in full.

Section 3. Repeal. The Redmond Comprehensive Plan is hereby amended to repeal the text, policies and other provisions as set forth in Exhibit 2, incorporated herein by this reference as if set forth in full.

Section 4. Severability. If any policy, section, sentence, clause, or phrase of this ordinance, or any policy adopted or amended hereby, should be held to be invalid or unconstitutional by a court of competent jurisdiction, such invalidity or unconstitutionality shall not affect the validity of any other policy, section, sentence, clause, or phrase of this ordinance or any policy adopted or amended hereby.

Section 5. Effective Date. This ordinance, being an exercise of a power specifically delegated to the city legislative body, is not subject to referendum, and shall take effect five days after passage and publication of an approved summary thereof consisting of the title.

CITY OF REDMOND

_____
ROSEMARIE IVES, MAYOR

ATTEST/AUTHENTICATED:

_____
BONNIE MATTSON, CITY CLERK

APPROVED AS TO FORM:
OFFICE OF THE CITY ATTORNEY:

By: _____

FILED WITH THE CITY CLERK:
PASSED BY THE CITY COUNCIL:
SIGNED BY THE MAYOR:
PUBLISHED:

EFFECTIVE DATE:
ORDINANCE NO.: _____

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Exhibit 1: Planning Commission Recommended Comprehensive Plan Sections for Adoption, with Potential Modifications Identified by City Council members

Goals, Vision and Framework Policy Chapter

Redmond's Comprehensive Plan is a reflection of the long-term values and preferences held by people in the community for how Redmond should look and feel over the next 20 years. This chapter expresses those values and preferences through:

- Goals that summarize the intent of the Comprehensive Plan,
- A vision, that describes what our community would be like in 2022 if the goals were achieved, and
- Framework policies that the City will follow to achieve the goals and vision.

The goals and framework policies express the core concepts on which the Comprehensive Plan is based and together set the direction for how various chapters of the Plan address the trends, opportunities and mandates facing the City.

The goals and framework policies are not listed in priority order, and need to be viewed as a whole that is balanced over time. One goal or value shall not be pursued to the exclusion of the others.

Goals for Redmond

- To **conserve** agricultural lands and rural areas, and to protect and enhance the quality of the natural environment.

- To retain and enhance Redmond's distinctive **character** and high quality of life, including an abundance of parks, open space, good schools and recreational facilities.

- To emphasize **choices** in housing, transportation, stores and services.

- To support vibrant **concentrations** of retail, office, service, residential, and recreational activity in Downtown and Overlake.

- To maintain a strong and diverse economy, and to provide a business **climate** that retains and attracts locally-owned companies as well as internationally recognized corporations.

- To promote a variety of **community gathering places** and diverse **cultural opportunities.**

- To provide convenient, safe and environmentally friendly transportation **connections** within Redmond, and between Redmond and other communities for people and goods.

- To remain a **community** of good neighbors, working together and with others in the region to implement a common vision for Redmond's future.

Our Future Vision for Redmond in 2022

What would Redmond be like as a place to live, work or visit if the community's values and preferences were achieved? The vision statement describes Redmond in the year 2022 if the Comprehensive Plan were implemented.

In 2022, Redmond citizens describe their community as one that is complete, offering a wide range of services, opportunities and amenities. It's a community that has gracefully accommodated growth and change while ensuring that Redmond's high quality of life, cherished natural features, and distinct places and character are not overwhelmed. It's a place where people are friendly, diversity and innovation are embraced, and action is taken to achieve community objectives. It's a place that is home to people from a variety of ethnic backgrounds, which contribute to the richness of the city's culture. (CC-1)

These goals were hard to achieve, but over the past 20 years through the clear, shared direction contained in the Comprehensive Plan, the vision has taken shape and throughout Redmond, the results are apparent.

Downtown is an outstanding place to work, shop, live and recreate and is a destination for many in Redmond and the region. Attractive offices, stores, services and residential developments have contributed to a new level of vibrancy while retaining a small town feeling that appeals to residents and visitors alike. Many more people live Downtown, and housing choices include a significant share of moderately priced residences. Strategic public and private investments have created a true multidimensional urban center with several new and expanded public amenities, including a city hall campus and central park that is a gathering place for the community, an arts and cultural center, a technology museum, a pedestrian connection to Marymoor Park, a Saturday market that is open all year, and a variety of quality arts and cultural programs and performances.

Various portions of Downtown have their own identity, design and appeal, yet it is easy to walk, bicycle, use transit or drive between them as well as to the rest of Redmond. Many visitors park in one of the conveniently located garages and walk or take transit to get to where they want to go. While pedestrian and bicycle access are emphasized, Downtown also provides for vehicular access and those who wish to drive through have other preferred routes to use. The congestion of 20 years ago has been tempered ~~not by the construction of major roadways but by improving operations and~~ primarily by providing reasonable and practical transportation alternatives together with improved operations and then increased capacity in strategic locations, such as important connections in the street grid and SR 520. (CC-2)

Old Town thrives as focus for retail activity that attracts pedestrians, providing a distinctive selection of stores, restaurants, galleries, and entertainment, as well as housing opportunities. New buildings blend with refurbished buildings, retaining the area's historic character. Cleveland Street is a pleasant place to walk or sit and people fill the street during the day and evening, particularly during the weekend. The former railroad right of way has been transformed to an urban green space that people of all ages enjoy, with places to stroll, gather and talk with others, celebrate, or stop and peek in store windows while walking to Old Town or Redmond Town Center.

Large open spaces, such as the Sammamish River, Anderson Park and Bear Creek, as well as abundant landscaping and a system of parks and other gathering places, create a sense of Downtown as an urban area within a rich, natural environment. A network of walkways, trails, vista points and plazas enable people to enjoy the natural beauty of the river, views of surrounding hillsides and mountains and other points of interest. Recent developments along the Sammamish River are oriented to and embrace the river, while maintaining adequate natural buffers.

Overlake has become recognized as a regional urban center that is the location of internationally known companies, corporate headquarters, high technology research and development companies, and many other businesses. While intensively and efficiently developed, the employment areas retain their campus-like feel due to attractive landscaping and the protection of significant trees and other important natural features. During the past 20 years, redevelopment of the commercial area in the southernmost part of Overlake has brought retail storefronts closer to the street and improvements to streetscapes to reflect the green character of Redmond, making the area more hospitable to transit, pedestrians and bicyclists. This portion of Overlake has also become much more diverse, featuring small neighborhoods with a mix of housing, small- scale shopping and services to serve employees and residents, and connections to a network of parks, sidewalks and trails. In many ways Overlake has demonstrated that high technology uses can thrive in a balanced urban setting that offers opportunities to live, work, shop and recreate to an increasingly diverse workforce.

Residential neighborhoods are treasured for their attractiveness, friendliness, diversity, safety and quietness. Redmond includes a broad choice of housing types at a range of prices, including affordable homes. During the past 20 years, there has been a lot more variety in the types and prices of new homes constructed in neighborhoods, including more cottages, accessory units, attached homes and other smaller single-family homes. New homes blend with existing homes and the natural environment, retaining the unique character of existing neighborhoods. Through careful planning and community involvement, changes and innovation in housing styles and development have been successfully embraced by the whole community.

Redmond has maintained a **strong economy and a diverse job base**. The City is the home to many small, medium-size and locally owned businesses and services, as well as nationally and internationally recognized corporations. Redmond is widely recognized as a community that is inviting for advanced technology, and businesses are proud to be partners in the community. The City provides a business climate that attracts sustainable development to the community and retains existing businesses. Likewise, the successful companies return benefits directly and indirectly to the community. A prime example of this is the support that both the residents and the business community have given to the school system to create an excellent educational system that serves the needs of citizens of all ages.

Neighborhood and community parks contribute to a high quality of life in Redmond by providing a full range of opportunities ranging from active recreation, such as sports and games, to more restful and reflective activities, such as walking and viewing wildlife. Residents enjoy larger natural areas, such as Watershed and Farrel-McWhirter Park, as well as smaller open spaces and gathering places located throughout the City close to residences and work places. Indoor and outdoor recreational facilities and programs meet the needs of residents of all ages. The bicycle capital of the Northwest has developed an excellent system of bike paths and trails that are used for recreation, commuting and riding to schools, parks and other destinations.

Redmond has embraced **energy efficient and environmentally sound transportation** systems. The City has invested strategically and leveraged regional funds (CC-4) to improve transportation choices and mobility, and every year more people walk, bicycle, carpool, or use transit or alternative fuel vehicles to travel. ~~Free or discounted~~ Transit service links all of Redmond's neighborhoods to the hubs of Downtown and Overlake, creating an attractive and practical transportation alternative. (CC-3) Overlake and Downtown are extensively served by high capacity transit that provides easy access to many destinations in the region. Transit stations along the route include shops, restaurants, offices and residences.

People spend less time traveling and more time where they want to be. All Redmond homes, schools and businesses have high-speed access to the internet. More neighborhoods and workplaces are served by nearby stores and services that are small in scale and well-designed. Significant investments in SR 520, I-405, and regional and local and transit routes ~~service and facilities~~ (CC-4) have improved mobility for people and goods. In Redmond, roadway projects have been built where needed to improve safety and operating efficiency, and the City has maintained a good system of access and circulation for delivery and freight. Most streetscapes are attractive and functional for various travel modes, with street trees and landscaped areas that separate pedestrians from traffic.

Infrastructure and services have been provided to meet the needs of a growing population as well as to correct existing deficiencies. Redmond has excellent police and fire protection and well- maintained and dependable public facilities. Redmond citizens embrace and support the high quality schools, cultural and recreational facilities in the community. The City works as a partner with schools, businesses, service providers and other organizations and jurisdictions to help strengthen a human services network that provides low-income families and persons with special needs the food, shelter, job training, child care and other services they need to become more independent. All the areas of urban unincorporated King County have been annexed so that they may receive a full range of urban services.

Redmond in 2022 has maintained a very green character; the City is framed within a beautiful natural setting and open spaces and an abundance of trees continue to define Redmond's physical appearance. A system of interconnected open spaces provides habitat for a variety of wildlife. The City prides itself for its environmental stewardship, including an emphasis on sustainable land use and development patterns, landscaping that requires little watering, and other techniques to protect and conserve the natural environment while flourishing as a successful urban community. Lake Sammamish and the Sammamish River, noted for their water quality, are used for boating, swimming and other types of recreation. Through many cooperative efforts, the improved water quality is demonstrated annually in the increasing salmon runs. Public access to shorelines has been enhanced while protecting the natural environment and property owners' rights. The open space and agricultural character of the north Sammamish Valley has been maintained and is highly valued by the community. Through the joint efforts of cities and the county, the Bear Creek and Evans Creek valleys remain rural, as do the areas north and east of the City.

Redmond is an effective, responsive local government that responds to and anticipates the changing needs of the community. **Many citizens actively participate** in Redmond's planning process and system improvements, and their preferences are incorporated so that Redmond continues to be the community desired by its citizens.

In 2022, as in 2003, Redmond is a community of good neighbors.

Framework Policies

To be effective, the goals and vision must be translated into policies, plan designations and actions. The framework policies are the overarching policies that help to communicate how the community wants Redmond to look and feel over the next 20 years and that set the direction for the rest of the Comprehensive Plan. In contrast, policies in the various chapters such as Land Use or Housing are more detailed and describe methods of accomplishing the vision. The framework policies are not listed in priority order, and need to be viewed as a whole that is balanced over time.

Participation and Evaluation

FW-1 **Encourage active participation by all members of the Redmond community in planning for Redmond's future.**

FW-2 **When preparing City policies and regulations, take into account the good of the community as a whole, while treating property owners fairly and allowing some reasonable economic use for all properties. Require predictability and timeliness in permit decisions.**

FW-3 **Establish and support a culture of dialogue and partnership among city officials, residents, property owners, the business community, and agencies and organizations.**

FW–4 **Evaluate the effectiveness of policies, regulations and other implementation actions in achieving Redmond's goals and vision for the future, and take action as needed.**

Conservation and Natural Environment

FW-5 **Protect the ecological functions of area ecosystems and enhance the quality of the natural environment by protecting and restoring important critical areas such as streams, wetlands, and aquifer recharge areas and by retaining and protecting significant trees and other natural resources.**

FW-6 **Protect and restore the natural resources and ecological functions of shorelines, maintain and enhance physical and visual public access, and give preference to uses that are unique or dependent on shoreline locations.**

FW-7 **Support Redmond as an urban community that values clean air and water, views of stars at night, and quiet neighborhoods.**

FW-8 ~~Reinforce~~ Emphasize Redmond's role as an environmental steward by conducting City business in a manner that:

- Increases community understanding of the natural environment and participation in protecting it.
- Promotes sustainable land use patterns and low-impact development practices.
- Leads by example in the conservation of ~~conserves~~ natural resources such as energy, water and trees and avoidance of adverse environmental impacts.
- ~~Minimizes or avoids adverse environmental impacts.~~

(CC-5; could also move this policy up in sequence)

Land Use

FW-9 Ensure that the land use pattern accommodates carefully planned levels of development, fits with existing uses, safeguards the environment, reduces sprawl, promotes efficient use of land and provision of services and facilities, encourages an appropriate mix of housing and jobs, and helps maintain Redmond's sense of community and character.

FW-10 Ensure that the land use pattern in Redmond meets the following objectives:

- Takes into account the land's characteristics and directs development away from environmentally critical areas and important natural resources.
- Encourages redevelopment of properties that are underutilized or inconsistent with the Comprehensive Plan designation.
- Conserves land in the North Sammamish Valley for long-term agricultural use and for urban recreation, and preserves rural land north and east of the City.
- Provides for attractive, affordable, high quality and stable residential neighborhoods that include a variety of housing choices.
- Focuses and promotes office, housing and retail development in the Downtown and in Overlake.
- Retains and encourages research and development, high technology and manufacturing uses in portions of Overlake, Willows and SE Redmond.
- Provides for industrial uses in suitable areas, such as portions of the Bear Creek Neighborhood.
- Provides opportunities to meet daily shopping or service needs close to residences and work places.
- Maintains and enhances an extensive system of parks, trails and open space.

FW-11 Plan to accommodate a future population of 65,700 people and an employment base of 94,100 jobs in the City of Redmond by the year 2022.

FW-12 Promote a development pattern and urban designs that enable people to readily use alternative modes of transportation, including walking, bicycling, transit, and car pools.

Housing

FW-13 **Create opportunities for the market to provide a diversity of housing types, sizes, densities and prices in Redmond to serve all economic segments and household types, including those with special needs related to age, health or disability.**

FW-14 **Encourage a housing supply in Redmond and nearby communities that enables more people to live closer to work, reduce commuting needs, and participate more fully in the community.**

Economic Development

FW-15 **Support sustainable and environmentally sound economic growth with appropriate land use regulations and infrastructure investments.**

FW-16 **Maintain a strong and diverse economy and tax base that provides a variety of job opportunities, supports the provision of excellent local services and public education, and keeps pace with economic and demographic changes.**

FW-17 **Maintain and enhance a broad variety of retail and service business choices that meet the needs of the greater Redmond community.**

Neighborhoods

FW-18 **Strengthen ongoing communication between each neighborhood and City officials.**

FW–19 **Make each neighborhood a better place to live or work by preserving and fostering each neighborhood's unique character while providing for compatible growth in residences and other land uses, such as businesses, services or parks. ~~residential and business growth~~. (CC-9)**

Downtown

FW-20 **Promote an economically healthy Downtown that is unique, attractive, and offers a variety of retail, office, service, residential, cultural and recreational opportunities.**

FW-21 **Nurture a Downtown Redmond that reflects the City's history and small town look and feel, preserves its natural setting, integrates urban park-like qualities, and serves as the primary community gathering place, and entertainment and cultural destination, for the greater Redmond area.**

FW–22 **Enhance the pedestrian ambiance of Downtown through public and private investments.**

FW-23 **Foster Old Town's identity as a destination that has retained its historic identity and traditional downtown character, is linked through attractive pedestrian connections to the rest of Downtown, and provides an inviting atmosphere in which to shop, stroll or sit during the day and evening.**

Overlake

FW-24 and 25 – to be developed (CC-7)

Parks and Recreation

FW-26 **Maintain and promote a vibrant system of parks, trails, open space, art and recreational facilities that provide infrastructure designed to meet community needs, enhance Redmond's high quality of life, and protect its natural beauty.**

FW-27 **Provide citizens of all ages, including seniors and teens, with diverse, attractive, safe and accessible recreational and cultural opportunities. Accommodate a broad range of community interests including active programs, such as sports, as well as opportunities for passive enjoyment, such as gathering areas and art, within a variety of civic settings.**

Facilities and Services

FW-28 **Plan, finance, build, rehabilitate and maintain capital facilities and services consistent with the following principles:**

- **A. Provide facilities and services that support the City's vision and land use plan as articulated in the Redmond Comprehensive Plan;**
- **B. Ensure that capital facilities are well-designed, attractive, and safe;**
- **C. Provide facilities and services that protect public health and safety;**
- **D. Ensure adequate provision of needed infrastructure and services;**
- **E. Allocate infrastructure funding responsibilities fairly;**
- **F. Establish priorities for improvements and provide reasonable certainty that needed facility and service improvements are completed within a reasonable time.**

FW-29 **Ensure that the cost of capital facility improvements are borne in proportion to the benefit received. Allocate the cost of facilities that are generated by, and that benefit growth, to those generating that growth.**

Transportation

FW-30 **Ensure that Redmond's character as a green city with a small town feel is protected when planning, constructing and maintaining the transportation system. Prioritize, plan, and invest in transportation in ways that achieve Redmond's land use and community character objectives.**

FW-31 **Develop strong local transportation connections that are multimodal, well designed, and appropriately located for the movement of people, goods, and freight among Redmond's Downtown, residences, shopping, employment, government, parks and schools.**

FW-32 **Promote mobility choices by developing a range of practical transportation alternatives. Increase transportation investments that enhance the attractiveness of walking, bicycling, ~~community~~ local and regional transit routes and ride-sharing to promote the quality of life and health of Redmond's citizens and the environment. Address travel demand through mobility choices, as well as through projects and programs that increase street safety and operating efficiency.** (CC-8)

FW-33 **Develop strategies to influence regional decisions and leverage transportation investments to support and complement Redmond's land use, community character, and transportation objectives and to increase mobility, choice and access between the City and the region for people, goods and information.**

Community Character

FW-34 **Maintain Redmond as a green city with an abundance of trees, forested areas, open space, parks, wildlife habitats, riparian corridors, access to shorelines and other elements of its beautiful natural setting.**

FW-35 **Retain Redmond's small town feel while accommodating urban growth.**

FW-36 **Ensure that building and site design maintain and enhance Redmond's character, retain identities unique to neighborhoods and districts, and create places that are high quality, attractive, and inviting to people.**

FW-37 **Preserve Redmond's heritage, including historic links to native cultures, logging, and farming and its image as the Bicycle Capital of the Northwest, as an important element of the community's character.**

FW–38 **Retain and attract small- to medium- sized and locally-owned businesses in Redmond to offer distinctive goods and services.**

FW–39 **Provide a variety of gathering places in the community that provide citizens opportunities to enjoy the arts or views, to recreate, or to meet with others.**

FW-40 **Promote opportunities to enhance public enjoyment of river and lake vistas and provide public places to take advantage of the Sammamish River as a community green gathering place.**

FW–41 **Enhance Redmond as a community that is child-friendly and safe; supports neighborhoods, families and individuals; and is characterized by diversity, innovation, creativity and energy.**

Human Services

FW-42 Improve the welfare and independence of Redmond citizens by supporting the provision of human services to all in the community.

FW-43 Ensure that human service programs reflect and are sensitive to the cultural, economic and social diversity of the City.

Regional Planning and Annexation

FW-44 Develop and support regional policies, strategies and investments that reflect the vision and policies of the Redmond Comprehensive Plan. Achieve local goals and values by participating fully in implementation of the Growth Management Act, VISION 2020, and the King County Countywide Planning Policies.

FW-45 Work with other jurisdictions and agencies, educational and other organizations, and the business community to develop and carry out a coordinated, regional approach for meeting the various needs of Eastside communities, including housing, human services, economic vitality, parks and recreation, transportation, and environmental protection.

FW-46 Work cooperatively with residents and property owners to annex all land within the designated Potential Annexation Area.

Exhibit 2: Planning Commission Recommended Comprehensive Plan Sections for Repeal

Goals and Vision Chapter

Organization of this Chapter

Redmond's Goals and Vision for the Future are included in this chapter. The chapter is divided into the following sections:

The Introduction describes the intent of the Goals and Vision Chapter and its relationship to the other Comprehensive Plan chapters.

The Planning Context describes how the policies in this chapter respond to the requirements of the Growth Management Act and the Countywide Planning Policies.

The Goals for Redmond are 10 goals that guide the future development of the City.

Our Future Vision for the Redmond Community describes the intended future for Redmond in 20 years. The vision is based in part on the goals for Redmond.

The Vision Policies are divided into the following areas:

A. Framework Policies: Refining the Goals guide the development of the Comprehensive Plan and amendments to the Comprehensive Plan. They will also be used to help carry out the Comprehensive Plan over its lifetime.

B. Implementation Policies: Making Our Vision a Reality describe the continuing actions the City of Redmond will need to undertake to make the Plan a reality. These policies include an annual monitoring report on the Comprehensive Plan, annual amendments to the Plan and a comprehensive five-year review of the Plan to ensure it meets the needs of the Redmond community. (Ord. 1847)

Introduction

The goals and vision for the future described in this chapter guide the preparation and implementation of the Comprehensive Plan. The other chapters are coordinated with this chapter to help achieve the overall goal of improving the quality of life in Redmond.
(Ord. 1847)

Planning Context

The goals and vision for the future described in this chapter are intended to keep the City of Redmond focused on how the Redmond community wants to look and feel over the next 20 years. This chapter is based on the results of an extensive citizen participation process that included a

series of community forums on Redmond's future, growth management and Downtown Redmond. This process also included several workshops on the character of the City and the meetings of the Citizen Advisory Committee. These views were combined with the requirements of Growth Management Act and implementing provisions to develop the Goals and Vision Chapter.
While recommended by state regulations, a Vision Chapter is not required by the Growth Management Act. Redmond has chosen to prepare one to help achieve consistency across the various chapters of the Comprehensive Plan, to help describe what the Redmond community wants for the future and to illustrate some of the probable results of the policies proposed in the Comprehensive Plan. (Ord. 1847)

Goals for Redmond

This Comprehensive Plan is based on 10 key goals for the future of Redmond:

- To provide for a high quality of life.
- To protect the quality of the environment.
- To conserve agricultural lands and rural areas.
- To encourage attractive, high quality residential neighborhoods.
- To encourage a broad range of housing opportunities to meet community needs.
- To promote vital commercial and industrial neighborhoods and a strong and diverse economy.
- To involve the public in City decisions.
- To improve mobility for people and goods.
- To assist in meeting the recreational, educational, social, economic and cultural needs of community residents.
- To maintain a safe community.

The goals are the general ends that the Comprehensive Plan intends to achieve. The goals give general direction to the City as it carries out the plan policies, but the goals alone are not the basis for specific actions or decisions.

The goals are not listed in priority order. Redmond will seek to strike a balance in achieving these goals; one goal shall not be pursued to the exclusion of the others. It is important to recognize that the City of Redmond cannot achieve these goals on its own. Accomplishing the goals will require a partnership between the City, residents, property owners, the business community, non-profit corporations and county, state and federal agencies. (Ord. 1847)

Our Future Vision for the Redmond Community

The vision statement is a description of Redmond 20 years from now to show how the Plan can help achieve Redmond's goals. This vision for the future of Redmond is built upon the values and opinions of area residents and an analysis of the trends, opportunities and mandates facing the City. The vision is a word picture of the future. Like the goals, it is not intended to direct specific decisions on the location or intensity of development. The policies in the chapters do that.
As required by the Growth Management Act, the updated Comprehensive Plan looks out over the next 20 years. Therefore, the vision is set in the year 2012.

Vision Statement

Redmond in 2012 has a high quality of life. It is a healthy and dynamic suburban community framed within a beautiful natural setting. Redmond has used this rich natural setting and good community design to develop a true sense of place.

An overview of the community includes the following areas:

- Attractive residential neighborhoods are found on the hills overlooking Lake Sammamish and the Sammamish River Valley, on Education Hill, immediately north of downtown, and on the hills and terraces west of the Bear Creek and Evans Creek valleys.

- Downtown is centrally located, spanning the area between the Sammamish River and lower Bear Creek. Downtown includes a vibrant mix of uses.

- Overlake, Redmond's second business and mixed-use center, is located in the southern part of the City. Another commercial area also is located at the intersection of State Routes (SR) 520 and 202. Businesses that serve residents' everyday needs are located near residential neighborhoods.

- High technology, research and development, and high-wage manufacturing firms are located northwest of Downtown, west of Willows Road and in Southeast Redmond.

- The open space and agricultural character of the north Sammamish Valley has been maintained. The Bear Creek and Evans Creek valleys remain rural, as do the areas north and east of the City.

Comfortable and affordable housing is located within safe, attractive and diverse neighborhoods conveniently connected by sidewalks and trails to other parts of the City as well as the regional trail system. The design of new residential areas integrates homes into the natural environment while older neighborhoods have retained their character. There is a broad choice of housing types at a range of prices, allowing families to live in homes that fit their needs. Families with low as well as high incomes can find the housing they want without stretching family budgets too far. Neighborhood and community parks also contribute to the high quality of life by providing a full range of recreation opportunities ranging from competitive activities, such as sports and games, to more restful and reflective activities, such as walking and wildlife viewing. Redmond's resource parks, the Watershed and Farrel-McWhirter Park, provide city residents with natural areas. Indoor and outdoor recreational facilities and programs meet the needs of residents of all ages.

New developments have been designed and constructed to protect the environment. Lake Sammamish and the Sammamish River enjoy high water quality and are used for boating and swimming. Improved water quality has helped the salmon to make a comeback. Open spaces and plenty of trees continue to define Redmond's physical appearance.

Redmond has two major mixed-use centers: Downtown and Overlake. Both centers contain an attractive and livable combination of retail, employment and residential uses. Redmond's vibrant downtown is a focus for the community and provides shopping, entertainment, arts, recreation,

services and housing. The buildings in "Old Town" have been refurbished while retaining their historic character. Overlake is home to major corporations and small businesses, it contains intense research and development centers, pedestrian-oriented commercial businesses, low-impact light manufacturing uses and expanded housing opportunities. Both areas have popular parks.

Businesses also are located in other areas identified above. The City has focused on attracting sustainable development to the community. Judicious land use and design regulations have protected nearby neighborhoods from the impacts of other uses.

In 2012, Redmond is served by many modes of transportation. The Regional Transit Project has brought light rail service to Overlake. Future service is planned to Downtown, with service to Kirkland, Bellevue, Seattle and beyond. The transit stations include shops, restaurants, offices and residences. Local transit service has also been greatly improved. Expanded dial-a-ride and circulator bus service better serve the needs of residential neighborhoods. Streets and highways have been improved to meet traffic, pedestrian and bicycle needs. The bicycle capital of the Northwest has an excellent system of bike paths and trails that are used for recreation, commuting and riding to school. Redmond homes, schools and businesses are well connected to the "Information Super Highway." These improvements allow people to spend less time traveling and more time where they want to go.

Efficient public services help maintain the high quality of life. Redmond is an efficient, responsive local government that adapts to the changing needs of its citizens. Redmond is served by high quality schools, a City government that understands the wide range of services needed to nurture healthy families and a wealth of cultural and recreational opportunities. The City works as a partner with churches, schools, businesses, service providers and other jurisdictions to help "build" a human services network that provides low-income families and persons with special needs the food, shelter, job training, child care and other services they need to become more independent. The community is involved in crime prevention and fire safety.

Urban areas west of Redmond to 132nd Avenue NE and north to NE 124th and 128th Streets have been annexed so that they may receive a full range of urban services.

In 2012 - as in 1994 - public participation remains an important part of Redmond's planning process. Citizen comments were incorporated into the draft Comprehensive Plan so that Redmond would become the community desired by its citizens. Citizen comments are sought and considered in decisions carrying out the Plan. The broad agreement on the Plan and clear and efficient permitting processes have helped to achieve community goals and provide for quick decisions on developments that are consistent with the Plan. (Ord. 1847)

Goals and Vision Policies

A. Framework Policies: Refining the Goals

To be effective, the goals and vision must be translated into policies, plan designations and actions. The framework policies fulfill that function. The framework policies begin with the designation "FVI," which stands for framework policy, Vision Chapter.

FVI-1 The Redmond Comprehensive Plan shall carry out the goals and vision for Redmond.

Planning to Accommodate Growth

The Redmond Comprehensive Plan prepares for the future by scheduling public facility improvements to meet the demand created by new development in areas designated for growth. These improvements will be provided in phases and will be paid for by a combination of public and private funds where appropriate. The Plan also has undergone Washington State Environmental Policy Act (SEPA) review so the development encouraged by this Plan can be undertaken more quickly and with fewer reviews.

Planning for growth increases certainty for those areas designated for development. It also increases protection for areas planned for preservation because an outlet is available for the growth that would have occurred in these areas. Planning for growth does not mean that growth can occur anywhere. Some areas will remain at their existing level of development; others will be protected for their natural resource values. In other areas, public facility capacity may be built toward the end of the planning horizon, limiting growth in these areas until the public facilities are available.

To determine the demand for various land uses and services, Redmond has projected future population and employment growth. A population of 56,550 persons and a total employment base of 68,500 employees is projected for 2012. These projections include the existing City limits and probable annextions in Southeast Redmond, North Redmond, and west to 132nd Avenue NE. These projections are coordinated with the Office of Financial Management population projections for King County and the housing and employment targets set by the Countywide Planning Policies. The Comprehensive Plan is based these population and employment projections. The City will update other plans, such as the water plan and sewer plan, to meet these projections. These plans are called functional plans.

FVI-2 The Redmond Comprehensive Plan and City functional plans shall prepare to accommodate the Growth Management Act population and employment targets. The Comprehensive Plan shall be based on housing and employment projections consistent with the state projection and the targets in the Countywide Planning Policies.

FVI-3 Redmond should include a variety of housing types to meet the needs of all income levels and household types. Sufficient area should be allocated for housing to meet the market demand and housing needs of the Redmond community while balancing other community goals.

FVI-4 Redmond should include a broad variety of retail and service businesses that meet the needs of community residents. Sufficient area should be allocated to these uses to meet the market demands of the Redmond area while balancing other community goals.

FVI-5 Redmond should contain a broad variety of business uses to provide for a diversity of job opportunities, to meet community and regional needs and to reduce the impacts of business downturns in individual industries on the community as a whole. Sufficient area should be allocated to these uses to meet current and projected market demands and community economic development objectives while balancing other community goals.

FVI-6 The Redmond Comprehensive Plan should encourage a land use pattern that:
A. Maintains the character of residential neighborhoods;
B. Conserves rural and agricultural lands;
C. Promotes retail development in compact centers;
D. Provides opportunities for high wage jobs, and
E. Ensures open spaces and parks throughout.

FVI-7 The Comprehensive Plan and implementing regulations shall encourage the redevelopment of underutilized properties, blighted properties or properties with uses that are inconsistent with the Comprehensive Plan designation.

FVI-8 The Comprehensive Plan and Development Regulations shall allow some economic use of all properties within Redmond, taking into account all of the contiguous land in the same ownership. When preparing policies and regulations, the cumulative effect of the entire Plan and all applicable regulations on the use of the properties shall be considered.

FVI-9 The Redmond Comprehensive Plan and implementing regulations shall fairly allocate infrastructure funding responsibilities, promote predictable decision making and encourage timely permit decisions.

Incorporate Redmond's Natural Setting into the Plan and Protect and Enhance the Environment

Redmond has a rich and beautiful natural setting. Lake Sammamish, the Sammamish River, the hills, the forested slopes, the valleys and the creeks provide an attractive and environmentally sensitive setting for Redmond. The Comprehensive Plan seeks to retain the key features of the natural setting and to protect the environment by directing growth away from fragile areas. The unavoidable impacts of growth on the environment will be minimized and mitigated. Opportunities for enhancing the environment on publicly managed land will be identified and carried out.

FVI-10 The Redmond Comprehensive Plan should direct development away from areas subject to natural hazards.

FVI-11 The Redmond Comprehensive Plan should limit development in areas with significant natural resource values to protect the resources from serious adverse impacts.

FVI-12 The Redmond Comprehensive Plan and implementing regulations shall protect the functions of area ecosystems, important critical areas and important natural resources.

Planning for Mobility

Improved mobility is a key objective of the Redmond Comprehensive Plan. The Redmond Comprehensive Plan reaffirms Redmond's commitment to Vision 2020, the Growth and Transportation Strategy for the Central Puget Sound, as modified by the Multi-County Planning Policies. Vision 2020 provides for a combination of transportation system improvements and compatible land uses that promote the efficient movement of people and goods. Vision 2020 recognizes that growth and transportation issues are intertwined. It seeks to ensure diverse, economically and environmentally healthy communities, framed by open space, and connected by a high-quality, efficient transportation system; it calls for containing growth by restricting the expansion of urban areas, thereby limiting the extent of sprawl into surrounding farmlands, forests and open spaces.

The Comprehensive Plan echoes this theme by providing transportation improvements to address current and future mobility problems while promoting a land use pattern that lessens trips and makes transit, walking and biking workable transportation options. The Plan provides a balanced transportation improvement program that includes transit improvements, bike ways, pedestrian improvements, new streets, and street and freeway capacity improvements.

The Comprehensive Plan accommodates eventual construction of the high capacity transit project, but is not dependent on it. The development pattern and transportation improvements are consistent with future development for high capacity transit. However, the Plan can work without high capacity transit, although shifting transportation funds may be necessary.

FVI-13 The Redmond Comprehensive Plan should encourage a land use pattern that provides opportunities to lessen trip travel lengths and frequency and allows the use of a variety of transportation modes including transit, car and van pools, bicycling and walking, in addition to automobiles.

FVI-14 The Redmond Comprehensive Plan should encourage a land use pattern that reduces dependency on vehicles.

FVI-15 Public facilities, transportation facilities and public services shall be planned and constructed in centers and other areas designated for growth in the Comprehensive Plan. These improvements shall be funded by public and private funds as appropriate.

Planning for an Urban Center and Advanced Technology Center

An Urban Center is a land use strategy employed by Vision 2020, the King County Countywide Planning Policies and the Redmond Comprehensive Plan to ensure mobility and to accommodate growth. An Urban Center is a concentration of jobs and housing within a defined boundary. It contains a mix of land uses. Because it is compact, a center can accommodate significant amounts of growth without consuming large amounts to land. This makes it economical to serve with public facilities and public services. Because of the mix of uses and compact character, many trips in an Urban Center can be made by walking, biking and transit.

Landowners, businesses, employees and residents in these areas benefit because the provision of services costs less. In addition, frequent trips, such as trips from home to work or work to services, are quicker and less costly because people can stay within the Center.

Advanced Technology Centers are also recognized by the Countywide Planning Policies. An Advanced Technology Center includes a mix of high technology office and manufacturing uses. This center creates a location where such uses can flourish.

Redmond has designated an Urban Center in Downtown Redmond and an Advanced Technology Center in Overlake. New development will be encouraged in these areas. These areas also will be the focus of public spending to accommodate growth. The centers eventually will be served by high capacity transit stations.

FVI-16 The Redmond Comprehensive Plan should encourage growth within Urban and Advanced Technology Centers.

FVI-17 The Redmond Comprehensive Plan should include public investment policies which support the City's land use plan and the Urban and Advanced Technology Centers strategy.
Coordinate with Other Plans and Communities

The Comprehensive Plan works to coordinate other plans affecting the Redmond community. The Comprehensive Plan is the basis for City street, water, sewer, stormwater and park and recreation plans. State agency plans also must be consistent with the Comprehensive Plan. Federal agencies are encouraged to help carry out the Plan. The plan allows private landowners the certainty to effectively plan for the future. The Plan shows landowners and developers where various uses are encouraged and where the City will provide public facilities and services.

This Plan is coordinated with the plans of King County and the cities of Bellevue, Kirkland, Woodinville and Issaquah. This coordination took place by considering the King County Countywide Planning Policies in the preparation of the Plan. One purpose of these policies is to ensure consistent comprehensive plans. The other jurisdictions also reviewed drafts of the Plan and Plan amendments. Redmond also will review the other communities' plans for consistency with Redmond's Plan.

FVI-18 The Redmond Comprehensive Plan and Plan amendments should be coordinated with the plans of neighboring jurisdictions, King County and state and federal agencies.

Encourage Efficient Use of Redmond's Existing Public Facilities

Redmond has a significant investment in streets, water facilities, sewer facilities, parks, schools, fire stations, a police station, a library and other public infrastructure. The Plan takes advantage of these investments by directing growth to areas that have available infrastructure capacity or can be economically served by facility expansion. Growth will be staged so that the public facilities and services needed to serve growth will be available when growth is allowed or soon after approval.

FVI-19 The Redmond Comprehensive Plan should encourage development in areas that can be efficiently served by public facilities and services.

FVI-20 Public facilities, transportation facilities and public services shall be consistent with the Comprehensive Plan.

Comprehensively Meeting Community Needs

Integral to the success of comprehensive planning is understanding who we are planning for, where they will be living, the type and range of services they will likely need, and how and where they will get those services. The Comprehensive Plan recognizes the importance of understanding the community and community needs.

A community also needs more than buildings, parks and public facilities; it needs social and cultural services as well. The Comprehensive Plan recognizes those needs and encourages the effective provision of those services in partnership with other public and private service providers.

FVI-21 The Redmond Comprehensive Plan should promote equity in terms of access, availability, and affordability.

Maintain Rural Areas and Resource Lands

While most rural areas and resource lands are outside the City of Redmond, easy access to rural areas is important to City residents. Rural areas give Redmond a visible boundary between other urban areas. Rural areas also allow for diverse lifestyles in the Redmond region.

The City of Redmond does contain resource lands and open space in the north Sammamish Valley. These areas will be maintained for open space and resource use. Other, limited areas of the City have a rural character that will be maintained.

The City of Redmond supports the maintenance of the Urban Growth Area boundary and the preservation of rural areas near the City. The City will not extend urban levels of services into rural areas. The City will not annex areas that are outside the Urban Growth Area designated under the Growth Management Act.

For those undeveloped areas within the Urban Growth Area, the Comprehensive Plan includes policies describing those areas that Redmond will annex and what conditions are necessary before annexation can occur. The Plan also identifies when urban services will be provided to these unincorporated areas. These policies will work together to convert undeveloped lands within the Urban Growth Area to urban uses in an orderly and cost-effective manner.

By planning for growth in Redmond and in areas to be annexed to the City, pressures will be reduced to convert rural areas and natural resource lands, such as farm and forest lands, to urban and suburban uses. This will protect Redmond's attractive natural setting and make Redmond and nearby areas more desirable places to live, work and operate a business.

FVI-22 The Redmond Comprehensive Plan should retain farmland and open space and direct intense development to other areas of the City.

Maintain Community Character

What makes one community unique from another may be its physical or population size, a unique industry or economic endeavor, its unique location or topographical features, its historical roots or existing cultural patterns. It may be noted for specific transportation or architectural features. All these create a sense of place and community. Even as changes occur over time the community can direct the character and design of that growth to shape the community into what they desire. The Comprehensive Plan recognizes the importance of maintaining some of the resources that have given the community its present uniqueness and character. It also recognizes that good urban design can affect the image of a city.

FVI-23 The Redmond Comprehensive Plan should encourage preservation of its existing unique features and use urban design principles to maintain an identity which is unique to the City of Redmond.

Planning for Action

A plan is carried out through regulations, public expenditures, private development and partnerships between the City and the private sector, adjacent communities and the region. The Comprehensive Plan is intended to be realistic and capable of being carried out. The Plan includes realistic plans for public expenditures, encourages private development in appropriate locations and is intended to be implemented by consistent regulations. The Plan also builds on Redmond's partnerships with the private sector, nearby communities and the region.

The Plan also considered the views of the Redmond community obtained in a variety ways, including the Redmond Community Forums, the Community Redmond workshops and the Comprehensive Plan Update Citizen Advisory Committee. Future amendments to the Plan and the decision-making processes implementing the Plan also will include opportunities for members of the public to give their opinions.

FVI-24 The Redmond Comprehensive Plan, Plan amendments and Plan updates shall include a citizen participation component that provides the opportunity for all members of the Redmond community to have their opinions considered.

FVI-25 The Redmond Comprehensive Plan chapters shall be consistent with this chapter and each other.

Land Use Policies

A. Land Use Framework Policies

The Vision Chapter sets an overall concept for Redmond's future development. The framework policies in this section translate the overall vision into one for land use in Redmond. The framework policies are preceded by "FLU." The framework policies are implemented by the land use policies in the following sections. These policies are preceded by the notation "LU."

The pattern of uses that make up a community can address a variety of needs and achieve a variety of goals. The following framework policies set out the key goals this chapter seeks to achieve. The preferred land use pattern in the following section shows how these goals translate into actual uses in the community.

FLU-1 The land use pattern should accommodate carefully planned levels of development, protect existing uses, safeguard the environment, reduce sprawl, promote efficient use of land, encourage alternative modes of transportation and help to maintain Redmond's sense of community.

FLU-2 The quality of the environment should be protected by taking into account the land's suitability for development and directing intense development away from natural hazards and important natural resources.

FLU-3 Agricultural areas should be conserved for long-term family farming by designating the north Sammamish Valley for agricultural uses.

FLU-4 Affordable, attractive, stable and high quality residential neighborhoods should be encouraged while providing for an appropriate variety of housing opportunities. Shopping opportunities for daily needs should be provided close to residences.

FLU-5 Vital commercial and manufacturing areas and a strong and diverse economy should be promoted by encouraging office and retail development Downtown and in Overlake, providing opportunities for research and development and high technology development in Overlake, Willows and Southeast Redmond and reserving land for manufacturing uses in suitable areas. Policies also should contain clear standards and predictable decision making to promote commercial and manufacturing activities.

Housing Policies

Housing Framework Policies

Framework policies in the Housing Chapter are defined by the citizen input, legislation and housing needs presented in the previous section. Framework policies represent general intended outcomes for the implementation housing policies presented in the next section of this chapter. As with the implementation housing policies, framework policies are divided into five topic areas: neighborhood quality, affordability, special needs housing, jobs/housing balance and housing planning and coordination.

A. Neighborhood Quality

Two of the City's roles in ensuring neighborhood quality are to provide a compatible mix of land uses in and around residential areas and to ensure that the basic elements of a well-designed neighborhood, landscaping, open space and building height, for example, are maintained and established in all Redmond neighborhoods.

For Redmond citizens, residential neighborhoods are perhaps the most desirable characteristic of the City. Creating attractive, safe and livable neighborhoods is a strong community value. In citizen input forums, Redmond residents have continually recommended that the City use policies and standards to retain high quality neighborhoods.

The framework policies presented in this section and the housing policies presented in the following section address the need identified by the Redmond community to continue to preserve, as well as to create, high quality residential neighborhoods. They also address the need to ensure a compatible mix of land uses in residential neighborhoods.

FHO-1 Existing and new residential neighborhoods in Redmond should be attractive and safe places to live, incorporating all of the qualities of well-designed, character-rich neighborhoods.

FHO-2 Redmond's residential neighborhoods should include a compatible mix of land uses in and around new and existing residential neighborhoods.

C. Special Needs Housing

Redmond's population includes persons with special housing needs. Special needs citizens require some assistance in their day-to-day living, such as the physically or mentally disabled, victims of domestic violence, chemical dependents, people living with AIDS, youth at risk and seniors. Family living situations, institutional settings, social service programs and assisted housing all serve a portion of those with special housing needs. Surveys of social service providers indicate that more families are seeking some form of housing assistance; three-fifths of the providers see housing as the most serious need facing their clients.

The City's role in meeting the demand for special needs housing in the City is two-fold. The first role is to make funding available to social service agencies providing housing to this population. Currently, the City allocates some financial resources for this purpose through its housing trust fund and Community Development Block Grant program. These funding sources are intermittent, however, and well below the level needed to support local special needs housing efforts.

A second role available to the City for addressing the demand for special needs housing is through the City's land use code. Based on nationwide policies and trends, social service agencies will increasingly turn to group homes and home-based care as the preferred method of housing special needs populations. Adding flexibility to the City's land use code to allow group homes and home-based care represents a significant opportunity available to the City for meeting the demand for special needs housing.

FHO-7 Housing opportunities should be available in Redmond for those with special needs, particularly for those with challenges related to age, health or disability.

FHO-8 Appropriate human service programs should be available to clients of special needs housing programs.

D. Jobs/Housing Balance

The balance between jobs and housing in Redmond is an important factor in determining the type and affordability of housing available in the City. The quantity and types of employment available in the City can affect housing at all income levels and for all residents. The purpose of linking jobs and housing is to plan for suitable housing opportunities for current and future Redmond employees.

FHO-9 The City's housing supply should be appropriate to the needs and desires of persons employed in and around Redmond.

E. Housing Planning and Coordination

Framework policies in this section address two important realities in housing planning. First, housing needs as well as solutions to those needs pay little attention to city boundaries. Housing issues are rarely centered on a single jurisdiction; therefore, regional cooperation in housing planning is important. Second, housing conditions change over time. In order to develop effective housing strategies, it will be important to track the effectiveness of existing policies and to make periodic adjustments to policies and regulations.

FHO-10 Redmond should work with other jurisdictions to develop a coordinated, regional approach to meeting the housing needs of Eastside communities.

FHO-11 The City should establish processes for measuring the effectiveness of policies and regulations in meeting the housing needs of Redmond residents.

Transportation Policies

A. Framework Policies

The following Transportation Framework Policies represent the most basic principles which guide the development of transportation planning plans, policies and strategies. Policy statements outlined in each of the Transportation Chapter subsections that follow relate either directly or indirectly to the Framework Policies.

FTR-1 Implementation of the City's land use plan and the regional growth strategy, Vision 2020, shall be the primary consideration when planning, developing, maintaining and administering the City's transportation system.

FTR-2 The City's transportation system shall promote mobility for Redmond citizens and workers by providing a range of equally practical transportation alternatives. The transportation system shall emphasize facilities and services which support and encourage transit, ride sharing, bicycling and walking as practical alternatives to use of the single-occupant vehicle (SOV).

FTR-3 The City's transportation system shall be based on the principal of honoring individual choices and preferences regarding personal transportation while at the same time striving to reflect the true cost of transportation alternatives in plans, policies and regulations.

FTR-4 The City shall maintain a transportation planning, funding and implementation framework which distributes costs and benefits equitably, assures adequate provision of needed infrastructure and offers reasonable levels of certainty regarding transportation system development.

Capital Facilities Policies

A. Framework Policies

The following Capital Facility Framework Policies represent the most basic principles which guide the development of capital facility plans, policies and strategies. Policy statements outlined in each of the Capital Facility Chapter subsections that follow relate either directly or indirectly to the Framework Policies.

FCF-1 The intent of the City's capital investment is to provide capital facilities and infrastructure which are needed by the community for civic purposes and which cannot be readily provided by individuals or groups other than City government.

FCF-2 When planning, developing and administering the City's capital investment program, primary consideration shall be given to the following goals:

A. Providing infrastructure to support the vision of Redmond's future as articulated in the Comprehensive Plan;

B. Supporting the provision of City services consistent with the expectations of the community, as expressed in the City's declared level of service standards;

C. Protecting public health and safety;

D. Rehabilitating or replacing the City's facilities and infrastructure as necessary to extend the useful life of existing facilities and ensure continued efficiency, and

E. Providing facilities which meet special needs of the community, such as those supported by voter-approved bonds.

FCF-3 The cost of new capital facilities and capacity improvements should be borne by those who benefit most directly. Those who benefit from a new facility should bear costs in proportion to the benefit received. The cost of facilities which respond to and mitigate the impacts of growth should be borne by those generating that growth.

Human Services Policies

A. Human Services Framework Policies

Human services are those services provided directly to individuals or families having difficulty meeting their basic human needs for:

- physical survival (food, shelter, clothing);
- adequate preparation for and help in sustaining gainful employment (employment and training programs, child care);
- social support and interaction, especially in times of personal family crisis (counseling, family reconciliation);

- assistance in overcoming specific pathologies (health, mental health, substance abuse, domestic violence);

- help in gaining access to available services (transportation, information about and referral to services).

Residents choose to use these services. They are not imposed upon people but simply are made available as resources or tools residents can use as they try to care for themselves and their families.

Services may be targeted geographically, by age group, or by specific condition. Residents should not be denied access to services because of physical barriers associated with the architectural design of or the location of offices, inaccessible hours of operation, stringent income eligibility requirements to qualify for services or lack of interpreters for persons who do not speak English.

FHS-1 Redmond shall help to improve the welfare of its citizens by supporting the provision of human services in the community.

FHS-2 Services may either be preventive or remedial. They are not meant to be used for long-term maintenance, but rather to assist recipients to achieve the greatest possible level of independence and to prevent further or more serious problems in the future.

FHS-3 Redmond shall ensure that human service programs reflect and are sensitive to the cultural, economic and social diversity of the City.

FHS-4 Redmond shall encourage the agencies serving its residents to make their services accessible to all in the community. Barriers to accessibility should be eliminated to the extent possible.

Parks and Recreation Policies

FPR-1 Redmond's natural beauty shall be protected through a vibrant system of parks, trails and open space.

FPR-2 Provide citizens of all ages with wholesome recreational and cultural opportunities in clean, properly maintained, safe and accessible facilities.

FPR-3 Preserve our quality living environment for future generations.

FPR-4 Open space should be provided to retain an important component of Redmond's character.

B. City Center Framework Goals and Policies

The following policies provide a framework to guide future development of Redmond's City Center. (Note: The following references to "comparison" centers mean a shopping area that contains a sufficient number of stores selling the same or similar goods to allow shoppers to compare price and quality. Comparison goods include clothing, related soft goods, furniture, appliances and specialty goods, such as jewelry.)

FCC-1 Promote the development of Downtown Redmond as the primary commercial activity center and destination location for the City and greater Redmond area.

FCC-2 Encourage development of a unique, attractive and economically healthy downtown that reflects Redmond's history and natural setting and offers a variety of service, office, retail, residential, cultural and recreational opportunities.

FCC-5 Foster Redmond's image as Bicycle Capital of the Northwest.

FCC-6 Encourage public and private development to retain and enhance the natural features in Downtown Redmond to create a unique and attractive urban park setting which will establish the image and character for development throughout the City.

FCC-7 Encourage the development of the City Center as the cultural focus of the greater Redmond area.

Attachment B: Summary of City Council Comments and Staff Responses

August 26, 2003 Study Session

Recommended Vision, Goals and Framework Policy Element

City Council member comments at the August 26 study session are summarized below. Staff responses to these comments are shown in underline and strike-out format in Exhibit 1 of Attachment A. The notation following each comment is keyed to each staff response.

Vision Statement

1 Reflect Redmond's growing ethnic diversity. (McCormick) – see CC-1, page 2

2. In Downtown discussion, edit to emphasize transportation alternatives while acknowledging will be some capacity improvements, such as connections to complete gaps in street grid and SR 520 improvements. (McCormick, Cole) – see CC-2, page 2

3. Concerned about reference to "free or discounted transit service linking all neighborhoods". While there are transit subsidies and discounts in place now, believe the concept of free or discounted transit service would be very difficult to achieve as written in the vision statement. (McCormick) – see CC-3, page 4

4. Clarify that "community" transit refers to location of service, not the operator. (McCormick) – see CC-4, page 4

Framework Policies

5. Increase emphasis on non-regulatory approaches to conservation (education, conservation of natural resources, being good stewards, low impact housing, etc...) (Robinson) - see CC-5, page 6.

6. Clarify meaning of "sustainable" (McCormick)

   In general, this term is intended to mean using resources in a manner that meets current needs while leaving future generations with as many opportunities to meet their needs as we have had ourselves, if not more. While the term has often been associated with conservation of natural resources and pollution prevention, it is also applied to other aspects of community well-being, including having an adequate supply of housing and a healthy economy. A search of the web indicates a great deal of information concerning sustainable development definitions and practices. Staff recommends adding a definition to better describe "sustainable" in the context of Redmond's Comprehensive Plan and Development Guide as part of continued work in 2003 and 2004.

7. Leave a placeholder to develop 1 or more framework policies for Overlake as part of urban center discussion – is an important area to call out. (McCormick) – see CC-7, page 8

8. Clarify that "community" transit refers to location of service, not operator. (McCormick) – see CC-8, page 9

9. Fix FW-19 to clarify that business isn't intended in each neighborhood (McCormick) see CC-9, page 7

Other Comments

- Value attracting creative people to the community; this depends in part on keeping and enhancing Redmond as a unique place. Believe this value is covered in proposed update. (Robinson)

- May want to clarify in first goal that agricultural lands include agriculture and urban recreation (Robinson)

  Staff believes that this issue is addressed through proposed policy FW-10 (page A-6, 3rd bullet in policy), which speaks to use of land in the North Sammamish Valley for both agricultural use and urban recreation. While the proposed goals speak to both conservation of agricultural land (1st goal) and having an abundance of parks and recreational facilities (2nd goal) they are intentionally less detailed than the framework policy.

- Transportation – important to have as many options as possible. (Plackett)

Concepts to consider in work on next level of policies

Neighborhoods – importance of completing neighborhood plan updates and leaving organizations in place. (Plackett)

Opportunities for public-private partnerships and potential development of criteria for partnerships (Plackett)

Opportunities to add lids over highways to provide additional space for needed parks, particularly in locations such as Overlake. (Plackett)

MEMO TO: City Council

FROM: Rosemarie Ives, Mayor

DATE: June 3, 2003

SUBJECT: **APPROVAL FOR EXTENDING THE TERM OF THE REDMOND-BELLEVUE, ET AL, INTERLOCAL AGREEMENT ESTABLISHING THE WASHINGTON CITY AND COUNTY PIPELINE CONSORTIUM**

I. RECOMMENDED ACTION

Approve Amendment No. 2 extending the term of the Interlocal Agreement establishing the Washington City and County Pipeline Consortium, and authorize the Mayor to sign the agreement.

II. DEPARTMENT CONTACT PERSONS

David Rhodes, Director of Public Works	556-2705
Bill Campbell, City Engineer/Assistant Public Works Director	556-2733

III. DESCRIPTION

A. Background:

The Washington City and County Pipeline Safety Consortium was established by Interlocal Agreement in the year 2000 in response to the devastating explosion of the Olympic pipeline in Bellingham. The current Consortium membership includes: Auburn, Bellevue, Bellingham, Bothell, Kent, Redmond, Renton, SeaTac, Seattle, Tumwater, Woodinville, Clark County and Thurston County.

The City of Bellevue is serving as the Administrator for the Consortium, and manages the funds, administers the contracts, and coordinates the regular monthly meetings.

The Interlocal Agreement establishing the Consortium provided for the Consortium to continue in effect for at least two (2) years from its creation in June, 2000. Paragraph 3.G on the Interlocal Agreement provides that additional

renewals may be approved by agreement of the principals. Council approved extending Redmond's participation for an additional year on July 2, 2002.

The goals established for the Consortium include:

- Provide a unified voice for member Cities and Counties on issues related pipeline safety;
- Jointly fund independent expert analysis and monitoring of the Olympic Pipeline Safety Action Plan and its implementation;
- Jointly fund advocacy and outreach on pipeline safety issues;
- Jointly fund participation in and comment on federal and state legislation;
- Work with the state on Washington Utilities and Transportation Commission (WUTC) pipeline safety activities;
- Other goals as defined by the membership.

In its brief three year existence the accomplishments of the Consortium have been both numerous and significant. They include:

- Development of a more positive and productive relationship with the Olympic Pipe Line Company for member jurisdictions;
- Retaining the services of Rick Kuprewicz, President of Accufacts, Inc and Robert J. Eiber, Pipeline Consultant. Both are nationally recognized experts on pipeline safety, operations and management;
- Commenting on state legislation establishing the WUTC Office of Pipeline Safety;
- Developing a positive and productive working relationship with the WUTC Office of Pipeline Safety;
- Drafting a model Pipeline Franchise Ordinance, in cooperation with the Municipal Research Services Center (MRSC), and making that model franchise available to all jurisdictions through the MRSC website;
- Commenting on federal pipeline safety legislation and federal Office of Pipeline Safety rulemakings regarding pipeline safety;
- Producing a significant study titled the "Overview Assessment of the 16 Inch Diameter Olympic Pipeline Integrity" with similar studies now underway for the 20 inch Olympic pipeline and both the 14 inch and 12 inch spurs that are present in member jurisdictions;
- Participating in the federal General Accounting Office audit of the federal Office of Pipeline Safety;
- Participating in the Washington State Joint Legislative Audit and Review Committee audit of the WUTC Office of Pipeline Safety.

There remain a number of pending pipeline safety activities and issues that are important for the Consortium to address and participate in, including:

- The pipeline integrity assessments that are already underway for the 20 inch Olympic pipeline and both the 14 inch and 12 inch spurs;
- State legislation re-authorizing the WUTC Office of Pipeline Safety;
- Pending federal pipeline safety legislation;
- Pipeline franchise negotiations in a number of jurisdictions;
- Assessing the impact of the recent bankruptcy declaration of Olympic Pipeline.

Recently, the WUTC Office of Pipeline Safety awarded the Consortium a $95,000 grant to fund pipeline safety activities in the State of Washington. A part-time employee has been hired by Bellevue to coordinate the Consortium activities funded by the grant.

IV. IMPACT

A. Service Delivery:

This project continues Redmond's participation in the Consortium to take a unified approach in addressing pipeline safety issues with particular emphasis on the operation of Olympic Pipe Line's system. This unified approach is much more effective when dealing with Olympic Pipe Line.

B. Fiscal:

The consortium will be funded by the $95,000 grant from WUTC through December 31, 2004.

V. ALTERNATIVES

Not approve the agreement. This will require Redmond to individually hire a consultant or team of consultants to address issues and concerns discussed above.

VI. TIME CONSTRAINTS

The original agreement expired on June 5, 2002, with the subsequent extension to June 5, 2003. This amendment extends the consortium interlocal agreement to December 31, 2004.

VII. **LIST OF ATTACHMENTS**

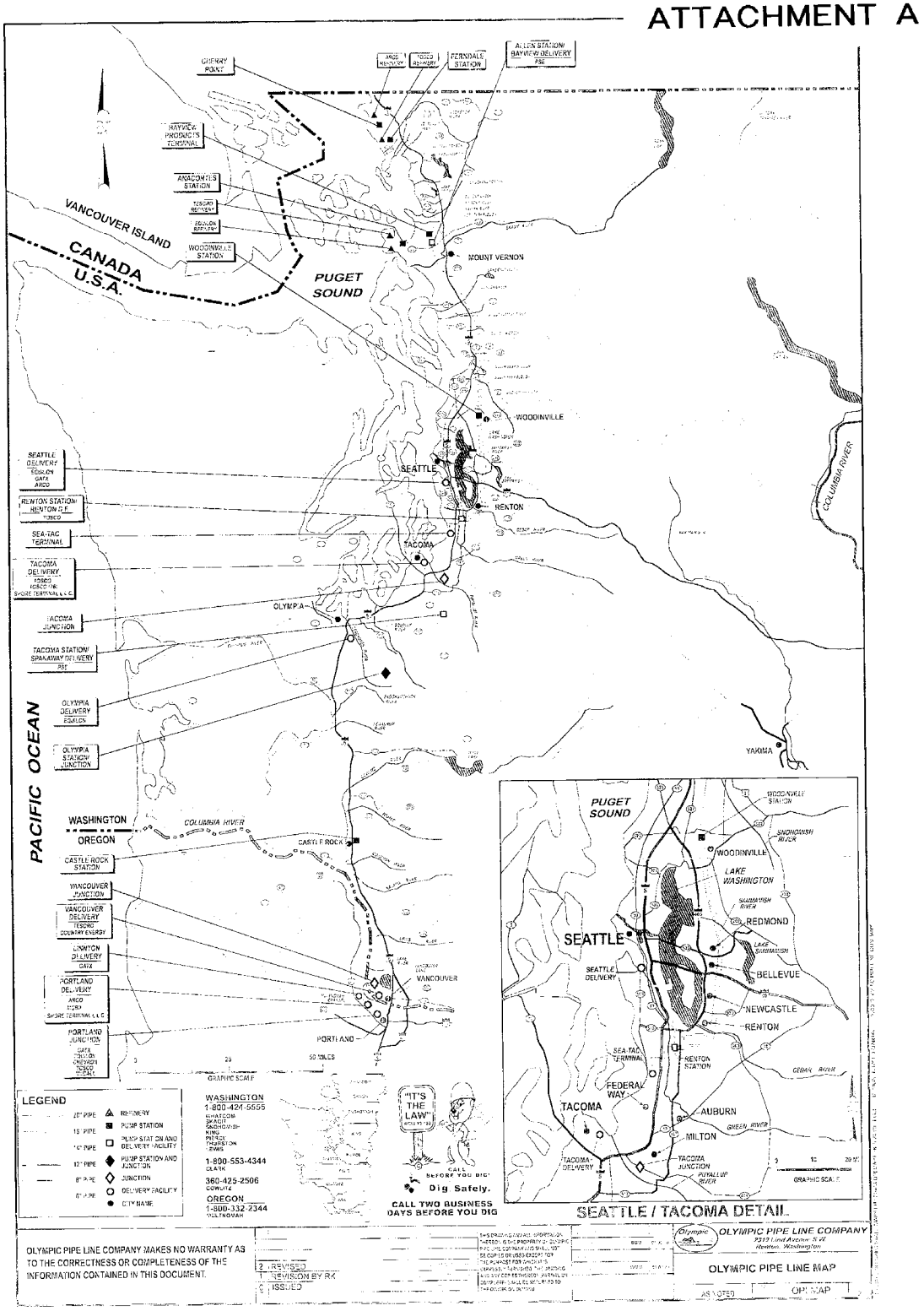
A. Vicinity Map
B. Amendment No. 2 to Interlocal Agreement
C. Amendment No. 1 to Interlocal Agreement
D. Interlocal Agreement Establishing the Washington City and County Pipeline Consortium

S/S

_____ _____
David Rhodes, Director of Public Works Date

Approved for Council Agenda S/S _____ _____
Rosemarie Ives, Mayor Date

ATTACHMENT A



Amendment 2 to Interlocal Agreement Establishing the Washington City and County Pipeline Safety Consortium

The undersigned parties to the Interlocal Agreement Establishing the Washington City and County Pipeline Consortium (the "Agreement") agree as follows:

1. In accordance with section 3.G of the Agreement, the duration of the Agreement is extended until December 31, 2004.

2. The Consortium will be funded in the current year with a grant from the Washington Utilities and Transportation Commission and will require no additional individual jurisdiction contribution.

3. No other provision of the Agreement is affected by the Amendment.

IN WITNESS WHEREOF, this Amendment No. 2 has been executed and affirms and ratifies participation in past consortium activities and for the next year by each party on the date set forth below.

CITY OF REDMOND

_____

_____

Date:_____

Approved as to form:

_____

_____

_____

Date: _____

Amendment 1 to Interlocal Agreement Establishing the Washington City and County Pipeline Safety Consortium

The undersigned parties to the Interlocal Agreement Establishing the Washington City and County Pipeline Consortium (the "Agreement") agree as follows:

1. In accordance with section 3.G of the Agreement, the duration of the Agreement is extended by one year, until June 5, 2003.

2. No other provision of the Agreement is affected by the Amendment

IN WITNESS WHEREOF, this Amendment No. has been executed by each party on the date set forth below.

CITY OF BELLEVUE

Connie Marshall
Mayor

Date:

Approved as to form:

Richard Gidley
Assistant City Attorney

Date

CITY OF BELLINGHAM

_____

Date: _____

Approved as to form

_____

Date: _____

PARTIALLY EXECUTED COPY

CITY OF BOTHELL

Approved as to form

Date: _____

Date: _____

CLARK COUNTY

Approved as to form:

Date: _____

CITY OF KENT

Approved as to form:

Date: _____

Date: _____

CITY OF REDMOND

Rosemarie M. Ives

Approved as to form:

JAMES E. HANEN
CITY ATTORNEY

Date: 1/14/03

Date: 1/9/03

CITY OF RENTON

Approved as to form:

Date:

Date:

CITY OF SEA TAC

Approved as to form:

Date:

Date:

CITY OF SEATTLE

Approved as to form:

Date:

Date:

THURSTON COUNTY

Approved as to form:

Date:

Date:

CITY OF TUMWATER

Approved as to form

Date _____

Date: _____

CITY OF WOODINVILLE

Approved as to form:

Date: _____

Date: _____

EXECUTED COPY

INTERLOCAL AGREEMENT ESTABLISHING THE WASHINGTON CITY AND COUNTY PIPELINE SAFETY CONSORTIUM

THIS AGREEMENT is entered into by and between the undersigned cities and counties. This Agreement is made pursuant to the Interlocal Cooperation Act, Chapter 39.34 RCW, and has been authorized by the legislative body of each jurisdiction.

WHEREAS, concern about pipeline safety has been expressed by the member cities and counties; and

WHEREAS, Cities and Counties along the Olympic Pipeline corridor have a common goal of ensuring the safety of their communities; and

WHEREAS, Cities and Counties seek independent, expert third party assessments of the condition of the Olympic Pipeline and its potential hazards; and

WHEREAS, Cities and Counties desire legal analysis of the pending pipeline safety legislation at the state and federal level and assistance in developing a model franchise;

WHEREAS, Cities and Counties desire expert third party analysis of the procedures required to maximize the safety of the pipeline; and

WHEREAS, Cities and Counties desire a unified voice relating to pipeline safety issues where Olympic Pipeline Facilities are located; now, therefore,

The City and County signatories agree as follows:

Establishment of the Washington City and County Pipeline Safety Consortium. There is hereby created a city and county consortium hereinafter called the Washington City and County Pipeline Safety Consortium (the Consortium). The parties hereto each hereby task the Consortium with the responsibility for achieving the following goals:

1. Provide a coordinated response for member Cities and Counties on certain issues related to fuel pipeline safety in general and the activities of Olympic Pipe Line Company in particular;

2. Obtain expert independent analysis and monitoring of the Olympic Pipeline Corridor Safety Action Plan so as to ensure it provides the degree of safeguards and security that our communities demand and deserve;

3. Identify deficiencies in Olympic Pipeline's Pipeline Corridor Safety Action Plan;

4. Identify steps Olympic Pipeline should take before re-starting the flow of product through its pipeline;

5. Provide advocacy and public relations services on behalf of cities and counties;

6. Monitor franchisee compliance in jurisdictions along pipeline corridors;

7. Coordinate signage and activity within pipeline corridor right of ways;

8. Analyze and provide comment on federal and state legislative efforts with regard to pipeline safety;

9. Work cooperatively with other groups and governments mutually interested in pipeline safety;

10. Work directly with the State of Washington and any state task force established to examine pipeline safety;

11. Work to meet other goals as defined by the membership.

1. Definitions.

A. Principal. A Principal is a City or County which has accepted the terms of, and is a party to, this Interlocal Agreement and has paid its share of the costs of the Consortium. The initial Principals to this Agreement are the undersigned cities and counties. Principals will receive services as offered by the Consortium according to such terms and conditions as may be established.

B. General Membership. The General Membership shall consist of all the voting representatives of the Principals.

C. Voting Representatives. Each Principal will designate one representative, and one alternate representative to vote on issues before the General Membership.

D. Alternate Representatives. Each Principal shall be entitled to designate one alternate representative who shall serve on behalf of the voting representative during his or her absence or inability to serve.

E. Administrator. The City of Bellevue shall be designated as the Consortium's Administrator. Principals shall pay to the City of Bellevue the agreed upon Financial Contribution.

F. Financial Contribution. Each Principal shall make an initial $5,000 Annual Financial Contribution. Additional Financial Contributions shall be provided in the future on a basis and in an amount agreed by the General Membership. A Principal shall be obligated as to any future Financial Contributions only upon ratification by its respective legislative body. A Principal shall be allowed to withdraw from the Consortium and not incur any additional financial obligation if its legislative body decides against a future Financial Contribution.

G. Executive Board. The Executive Board shall be composed of seven representatives of 7 different Consortium members, appointed by their jurisdictions. The initial slate of Executive Board Members shall include a member from each of the following jurisdictions: The cities of Bellevue, SeaTac, Renton, Redmond, Bellingham, Tumwater, and the county of Thurston. The initial Board shall serve for a period of one year from the effective date of this Agreement. Subsequent Boards shall consist of seven members elected by the General Membership from among the representatives appointed by their respective jurisdictions.

2. Roles

A. General Membership. The General Membership shall approve the budget and have final decision-making authority to approve the final budget and the work plan of the Consortium. The General Membership shall approve the members of the Executive Board.

B. Executive Board.

1.) Chair. The Chair of the Executive Board shall be elected by the members of the Board from the Board membership. The Chair of the Executive Board shall process issues, organize meetings and preside over meetings of the Board, and shall have no other powers than those enumerated here.

2.) Powers of the Executive Board. The Executive Board shall meet as often as it deems necessary and shall have the following powers:

(a.) To recommend periodic budgets and work plans for the Consortium for approval by the General Membership;
(b.) To establish policies to carry out the work plan approved by the General Membership;
(c.) To establish policies for expenditures of budgeted items for the Consortium;
(d.) To hold regular meetings on such dates and at such places as the Board may designate and call for meetings of the General Membership;
(e.) To authorize the Administrator to enter into agreements with other federal, state and local agencies, and private entities to receive grants and funds, and other agreements for services.

C. Administrator. City of Bellevue, as Administrator, shall contract for services as necessary to accomplish the purposes of the Consortium under this Agreement, subject to the approval of the Executive Board; establish a special fund or funds as authorized by RCW 39.34.030; collect from the Principals Financial Contributions due to Bellevue as Administrator for the Principals; and reimburse its Principals. In addition, the Administrator will provide for secretarial and other administrative support for the Board as the Board deems necessary. The Administrator shall not be reimbursed for expenditures made prior to the effective date of this Agreement.

3. Other Pertinent Matters

A. Proportionality of Representation/Voting. Each Principal shall be entitled to one vote on all actions required to be approved by the General Membership and each Principal which has a representative on the Executive Board shall be entitled to one vote on all actions required to be approved by the Executive Board.

B. Voting Percentage Requirements. All actions required to be approved by the General Membership or the Executive Board shall require approval of 70% of the vote of those present. Dissenting comments shall be recorded.

C. Quorum. A quorum at any meeting of the General Membership or the Executive Board shall consist of the voting members or Board members (or alternates) who represent a simple majority of the General Membership or Executive Board membership.

D. Additional Principals. The Executive Board may, by vote, accept new Principals who become parties to this Agreement and who have paid the agreed-upon amount as the new Principal's share. The Executive Board may, by vote, accept new Principals to the consortium by approving the proposed new Principal's signed agreement.

E. Finance and Budget.

1.) Acceptance of Funds. The Administrator is hereby authorized to accept all Financial Contributions of the Principals allocated to the Consortium and any federal, state or private grants in order to accomplish the purposes of this Agreement and Chapter 39.34 RCW.

2.) Budget. The Executive Board shall draft a proposed initial budget for the remainder of the current calendar year and present it to the General Membership. Thereafter, the Executive Board shall draft proposed period budgets as it deems appropriate. The General Membership shall review and recommend revisions to the draft budgets as it deems appropriate. The Executive Board shall revise the draft budgets and shall present them for a vote of the General Membership. The budgets are adopted when approved by the General Membership.

3.) Delinquencies. A Principal who is six months delinquent in payment shall be considered to have withdrawn from the Consortium. Withdrawal does not extinguish the obligation to pay for services rendered.

4.) Use Guidelines. The Consortium may use any available funds for any purpose authorized by this Agreement, and included in the work plan adopted by the Consortium. Additional projects and expansion of the scope of work are authorized, for purposes of this Agreement, when approved and funded by all the then current Principals or through any grants provided the Consortium. Consortium funds will not be used to pay for any City or County staff time.

F. Intergovernmental Cooperation. The Consortium shall cooperate in all practical and available ways with local, state and federal government agencies so as to maximize utilization of grant funds and to enhance the effectiveness of operations and to minimize costs.

G. Duration. This Agreement shall continue in effect for at least two years from creation of the Consortium. Additional one-year renewals shall be approved by agreement of the Principals. Any Principal may withdraw from this Agreement by giving 60 days written notice to the Executive Board of its intention to terminate. A Principal shall not be entitled to reimbursement for its financial contributions to the Consortium. A Principal who withdraws shall hold the remaining Principals harmless against any resultant increased costs allocated to them, for a project or contract approved by the General Membership before its withdrawal.

This Agreement shall be effective until terminated as provided herein. This Agreement may be terminated at any time by agreement of Principals holding at least 70% of the vote of all the Principals hereto. Upon termination of this Agreement, any assets acquired during the life of the Agreement or any financial contributions remaining shall be disposed of in the following manner:

1.) All property contributed without charge by each Principal shall revert to the contributor;

2.) All property purchased after the effective date of this Agreement shall be distributed based on the percentage of the total annual charges assessed by the Executive Board during the period of this Agreement and paid by each Principal;

3.) All unexpended or reserved funds shall be distributed to the Principals based on their financial contribution on a pro rata basis.

H. Hold Harmless. Except for acts or omissions which are dishonest, fraudulent, criminal or malicious, any loss or liability resulting from the acts or omissions of the Executive Board, or Administrator while acting within their scope of authority under this Agreement shall be borne by the Consortium. If a claim, demand, or cause of action arises from any other negligent act or failure to act, or intentional wrongful act of one of the Principals or its agents or employees, that Principal shall hold the Consortium and other Principals harmless except to the extent that the harm complained of arises from the negligence or other fault of another Principal; provided, that "Fault" as herein used shall have the same meaning as set forth in RCW 4.22.015.

I. Insurance. The Consortium may obtain and provide insurance for the Executive Board and the Administrator for coverage consistent with the terms of this Agreement.

J. Amendments. This Agreement may be amended by written agreement of the legislative bodies of all the Principals hereto.

K. Severability. The invalidity of any clause, sentence, paragraph, subdivision, section or portion of this Agreement shall not affect the validity of the remainder of the Agreement.

L. Effective Date. The effective date of this Agreement shall be the date of filing with the appropriate County Auditors, the Secretary of State, and the Clerk of each Principal.

IN WITNESS WHEREOF, this Agreement has been executed by each party on the date set forth below:

CITY OF BELLEVUE

Chuck Mosher
Mayor City of Bellevue

Date: June 26, 2000

Approved as to Form:

Lori M. Riordan
Assistant City Attorney

Date: 6/23/00

COUNTY OF KING

Approved as to Form:

Donald D. Rose
City Manager

Date: June 12, 2000

Wayne D. Tanaka
City Attorney

Date: June 12, 2000

CITY OF Woodinville

Attest: Sandra C. Stoffler
City Clerk/CMC

Approved as to Form:

Date: _____

Date: _____

CITY OF _____

Approved as to Form:

K. Severability. The invalidity of any clause, sentence, paragraph, subdivision, section or portion of this Agreement shall not affect the validity of the remainder of the Agreement.

L. Effective Date. The effective date of this Agreement shall be the date of filing with the appropriate County Auditors, the Secretary of State, and the Clerk of each Principal.

IN WITNESS WHEREOF, this Agreement has been executed by each party on the date set forth below:

CITY OF BELLEVUE

Chuck Mosher
Mayor

Date:_____

Approved as to Form:

Lori Riordan
Assistant City Attorney

Date:_____

CITY OF BELLINGHAM

Mark Asmundson
Mayor

Date: August 10, 2000

Attest: Christine Weinberg
FOR Finance Director
City of Bellingham

Approved as to Form

Office of the City Attorney
City of Bellingham

Departmental Approval:

Joan Honsington
City of Bellingham

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L. Effective Date. The effective date of this Agreement shall be the date of filing with the appropriate County Auditors, the Secretary of State, and the Clerk of each Principal.

IN WITNESS WHEREOF, this Agreement has been executed by each party on the date set forth below:

CITY OF BELLEVUE

Chuck Mosher
Mayor

Date:_____

Approved as to Form:

Lori Riordan
Assistant City Attorney

Date:_____

COUNTY OF _____

Michael W. Noblet
Mayor City of Bothell

Date: SEPTEMBER 18, 2000

Approved as to Form:

Michael Karber
Assistant City Attorney
City of Bothell

Date: _____

CITY OF _____

Date: _____

Approved as to Form:

Date:

CITY OF _____

Approved as to Form:

Date: _____

COUNTY OF Clark

Craig A. Ludem

Date: August 22, 2000

COUNTY OF _____

Date: _____

Date: _____

Approved as to Form

E Bronson Potter
Deputy Prosecuting Attorney

Date: August 22, 2000

Approved as to Form

Date: _____

I. Insurance. The Consortium may obtain and provide insurance for the Executive Board and the Administrator for coverage consistent with the terms of this Agreement.

J. Amendments. This Agreement may be amended by written agreement of the legislative bodies of all the Principals hereto.

K. Severability. The invalidity of any clause, sentence, paragraph, subdivision, section or portion of this Agreement shall not affect the validity of the remainder of the Agreement.

L. Effective Date. The effective date of this Agreement shall be the date of filing with the appropriate County Auditors, the Secretary of State, and the Clerk of each Principal.

IN WITNESS WHEREOF, this Agreement has been executed by each party on the date set forth below:

CITY OF BELLEVUE

Approved as to Form:

Chuck Mosher
Mayor

Date:_____

Lori Riordan
Assistant City Attorney

Date:_____

CITY OF REDMOND

Rosemarie Ives
Mayor

Date: 6-13-00

Approved as to Form:

JAMES E. HANEY
City Attorney

Date: 6/13/00

I. Insurance. The Consortium may obtain and provide insurance for the Executive Board and the Administrator for coverage consistent with the terms of this Agreement.

J. Amendments. This Agreement may be amended by written agreement of the legislative bodies of all the Principals hereto.

K. Severability. The invalidity of any clause, sentence, paragraph, subdivision, section or portion of this Agreement shall not affect the validity of the remainder of the Agreement.

L. Effective Date. The effective date of this Agreement shall be the date of filing with the appropriate County Auditors, the Secretary of State, and the Clerk of each Principal.

IN WITNESS WHEREOF, this Agreement has been executed by each party on the date set forth below:

CITY OF BELLEVUE

Chuck Mosher
Mayor

Date:_____

Approved as to Form:

Lori Riordan
Assistant City Attorney

Date:_____

COUNTY OF _____

Approved as to Form:

Date: _____

Date: 6-27-00

CITY OF Renton

Approved as to Form:

Jesse Tanner

Jesse Tanner, Mayor

Lawrence J. Warren

Lawrence Warren, City Attorney

I. Insurance. The Consortium may obtain and provide insurance for the Executive Board and the Administrator for coverage consistent with the terms of this Agreement.

J. Amendments. This Agreement may be amended by written agreement of the legislative bodies of all the Principals hereto.

K. Severability. The invalidity of any clause, sentence, paragraph, subdivision, section or portion of this Agreement shall not affect the validity of the remainder of the Agreement.

L. Effective Date. The effective date of this Agreement shall be the date of filing with the appropriate County Auditors, the Secretary of State, and the Clerk of each Principal.

IN WITNESS WHEREOF, this Agreement has been executed by each party on the date set forth below:

CITY OF BELLEVUE

Chuck Mosher
Mayor

Date:_____

Approved as to Form:

Lori Riordan
Assistant City Attorney

Date:_____

COUNTY OF _____

_____
_____
_____

Date: _____

Approved as to Form:

_____
_____
_____

Date: _____

CITY OF SEATAC

Calvin P. Hoggard
City Manager

DATE: 8/14/00

Approved as to Form:

City Attorney

IN WITNESS WHEREOF, this Agreement has been executed by each party on the date set forth below:

CITY OF BELLEVUE

Chuck Mosher
Mayor

Date: June 5, 2000

Approved as to Form:

Lori Riordan
Assistant City Attorney

Date:

COUNTY OF THURSTON

Chairman

Commissioner

Commissioner

Date: June 5, 2000

Approved as to Form:

EDWARD G. HOLM
PROSECUTING ATTORNEY

By:
Deputy Prosecuting Attorney

Date: June 1, 2000

K. Severability. The invalidity of any clause, sentence, paragraph, subdivision, section or portion of this Agreement shall not affect the validity of the remainder of the Agreement.

L. Effective Date. The effective date of this Agreement shall be the date of filing with the appropriate County Auditors, the Secretary of State, and the Clerk of each Principal.

IN WITNESS WHEREOF, this Agreement has been executed by each party on the date set forth below:

CITY OF BELLEVUE

Chuck Mosher
Mayor

Date:_____

Approved as to Form:

Lori Riordan
Assistant City Attorney

Date:_____

COUNTY OF _____

Approved as to Form:

_____
_____
_____

Date: _____

_____
_____
_____

Date: _____

CITY OF TUMWATER

Ralph C. Osgood
Mayor

Date: June 13, 2000

Approved as to Form:

P. Brock

Patrick L. Brock
City Attorney

Date: June 9, 2000

CITY OF _____

Approved as to Form:

_____
_____

_____
_____

A MODEL RECOVERY AND RECONSTRUCTION ORDINANCE
(Revised 1-9-96)

Prepared for FEMA/APA by Kenneth C. Topping, AICP

This model recovery and reconstruction ordinance follows the principles established elsewhere in this PAS report. It provides basic elements of a comprehensive ordinance establishing a recovery organization and authorizing a variety of pre- and post-event planning and regulatory powers and procedures related to disaster recovery and reconstruction. Designed to be adopted in advance of a major disaster, it can also be quickly adapted to post-disaster conditions if it has not been adopted before the disaster.

Unlike ordinary planning ordinances, this ordinance requires involvement by many other departments within the city or county government organization under the guidance and leadership of the city manager, county administrative officer, or equivalent position. Some of the actions called for by this ordinance require direct involvement of the planning department, although frequently acting in concert with other departments. Having an inherently inter-departmental focus, this ordinance structures a model ***process*** which has generic value. Due to widely ranging circumstances, however, the content may vary considerably.

The essential concepts of this ordinance include: the establishment of a recovery organization before a major disaster to prepare a pre-event plan; the adoption of that plan and this ordinance by the governing body before a major disaster occurs; and the use of the recovery plan and organization to efficiently and wisely guide post-disaster recovery and reconstruction activity. The recovery

organization may be constructed differently from place to place, but the idea is to create an ongoing organization integrated with, but extending beyond any existing emergency operations organization.

Although an existing emergency operations organization may serve as a useful base from which to fashion a recovery organization, there are certain fundamental differences in function which make it preferable to establish a recovery organization which operate parallel to the emergency response organization. Continuity of the recovery organization and expediting of the rebuilding processes for which it is responsible become very important.

1) With some exceptions, local government emergency response organizations tend to focus on emergency preparedness and response operations. Strongly oriented toward police and fire functions, during "peace-time" they characteristically handle routine local emergencies and undertake training and preparedness for disaster response operations. Typically, recovery and reconstruction functions do not fall within their purview, although this is beginning to change in some jurisdictions.

2) Some powers reflected by this ordinance are activated by the declaration of a local emergency. However, they are characteristically broader than emergency response powers because the latter do not include property, building, land use and development regulations, or the public hearing process.

3) Certain regulatory powers authorized by this ordinance are identified for initial implementation during the time in which a declaration of local emergency is in effect. However, such powers tend to be extended for much longer periods of time.

Although a declared emergency may not be terminated for months after the end of emergency response operations, complete implementation of rebuilding processes often takes years.

In short, this is an emerging area of disaster management practice which crosses over into city planning, redevelopment and building. Much of the thinking and implementation for the processes identified in this ordinance have only emerged within professional literature or practice within the past decade. Although some form of ad hoc recovery organization is created with every major disaster, such arrangements tend to exist for the peak rebuilding period and then are disbanded. As yet, very few local jurisdictions have formally created recovery organizations in advance of a disaster or maintained them continuously afterwards.

This ordinance structures many processes which tend to take place anyway after a major disaster without forethought or knowledge of available options. It provides organizational and procedural dimensions which can accelerate fundamental thinking and planning needed in advance of a disaster to recover and rebuild more wisely and efficiently than would happen were such preparation not to occur. It captures the broadest possible range of pre-event and post-disaster activities which interact with urban planning and development, recognizing that not all provisions may be germane to circumstances within individual communities.

There is little established practice of record to use as a point of departure. Few ordinances in use by local jurisdictions deal with such a broad scope of recovery functions. Those which have been adopted tend to cover a more limited range of

elements, such as rebuilding permitting and nonconforming use procedures. With the upswing in major disasters in the last several years, however, substantial experimentation is taking place, and more communication is occurring regarding outcomes of various recovery strategies attempted.

These processes will inevitably lead to revisions of the ideas reflected here. Therefore, this ordinance should be considered a framework for flexible application of pre-event and post-event procedures which can be modified to fit emerging ideas as well as local conditions. Although a separate ordinance is not essential to performance of many functions represented, the value of adopting a recovery ordinance is in providing clear policy guidance in advance for dealing with contingencies as well as an overall rationale in case of legal challenge.

The following ordinance language is interspersed with italicized commentaries which provide alternatives or amplification. Commentaries sometimes identify areas for possible modification or explain reasons why certain provisions are included. Commentary has been omitted for sections that are self-explanatory or unlikely to require change. Certain conventions have been included throughout which will require change by some local governments. The term "city" will require replacement with the correct term for county or town governments. The numbering system is designed to reflect the structure of the ordinance content and may require adaptation to the numbering of local ordinances.

Chapter ___. Disaster Recovery and Reconstruction

WHEREAS, the city is vulnerable to various natural hazards such as earthquakes, flooding, wildfires, and wind, resulting in major disasters causing substantial loss of life and property;

WHEREAS, the city is authorized under state law to declare a local state of local emergency and take actions necessary to ensure the public safety and well-being of its residents, visitors, business community and property during and after such major disasters;

WHEREAS, it is essential to the well being of the city to expedite recovery and reconstruction, mitigate hazardous conditions, and improve the community after such major disasters;

WHEREAS, disaster recovery and reconstruction can be facilitated by establishment of a Recovery Organization within the city government to plan, coordinate and expedite recovery activities;

WHEREAS, preparation of a pre-event plan for disaster recovery and reconstruction can help the city organize to expedite recovery in advance of a major disaster and to identify and mitigate hazardous conditions, both before and after such a disaster;

WHEREAS, recovery can be expedited by pre-event adoption of an ordinance authorizing certain extraordinary city actions to be taken during the declared local emergency to expedite implementation of recovery and reconstruction measures identified in a pre-event plan;

WHEREAS, it is mutually beneficial to cooperatively plan relationships needed between the city and other governmental authorities such as the Federal Emergency Management Agency, Small Business Administration, Department of Housing and Urban Development, State Emergency Management Agency (or equivalent);

WHEREAS, it is informative and productive to consult with representatives of business, industry and citizens' organizations regarding the most suitable and helpful approaches to disaster recovery and reconstruction;

The City Council (or county or town equivalent) does hereby ordain:

Section 1. Authority. This ordinance is adopted by the City Council (or county or town equivalent) acting under authority of the City Municipal Code (or county or town equivalent), State Emergency Management Act (or equivalent), and all applicable federal laws and regulations.

Section 2. Purposes. It is the intent of the City Council under this chapter to: authorize creation of an organization to plan and prepare in advance of a major disaster for orderly and expeditious post-disaster recovery and to direct and coordinate recovery and reconstruction activities; direct the preparation of a pre-event plan for post-disaster recovery and reconstruction to be updated on a continuing basis; authorize in advance of a major disaster the exercise of certain planning and regulatory powers related to disaster recovery and reconstruction to be implemented upon declaration of a local emergency; identify means by which the city will take cooperative action with other governmental entities in expediting recovery; and implement means by which the city will consult with and assist citizens, businesses and community organizations during the planning and implementation of recovery and reconstruction procedures.

Section 3. Definitions. As used in this ordinance, the following definitions shall apply:

3.1 Damage Assessment Survey. A field survey to determine levels of damage for structures and/or to post placards designating the condition of structures.

3.2 Development Moratorium. A temporary hold, for a defined period of time, on the issuance of building permits, approval of land use applications or other permits and entitlements related to the use, development and occupancy of private property in the interests of protection of life and property.

3.3 Director shall mean the Director of Recovery Operations or an authorized representative.

3.4 Disaster Assistance Centers (DACs). A multi-agency center organized by FEMA for coordinating assistance to disaster victims.

3.5 Disaster Field Office (DFO). A center established by FEMA for coordinating disaster response and recovery operations, staffed by representatives of federal, state and local agencies as identified in the Federal Response Plan (FRP) and determined by disaster circumstances.

3.6 Disaster Survey Report (DSR) shall mean a claim by a local jurisdiction for financial reimbursement for repair or replacement of a public facility damaged in a major disaster, as authorized under the Stafford Act and related federal regulations, plans and policies.

3.7 Emergency shall mean a local emergency, as defined by the Municipal Code, which has been declared by the City Council for a specific disaster and has not been terminated.

3.8 Event shall mean any natural occurrence which results in the declaration of a state of emergency and shall include earthquakes, fires, floods, wind storms, tsunamis, etc.

3.9 Federal Response Plan (FRP). A plan prepared by FEMA and over two dozen other federal departments and agencies to coordinate efforts of a large number of federal, state and local agencies in providing response and recovery assistance in an expeditious manner.

3.10 Flood Insurance Rate Map (FIRM). A map showing the outer boundaries of the floodway and floodplain as determined by the FEMA Flood Insurance Administration through the Flood Insurance Rate Map program.

3.11 Hazard Mitigation Grant Program. A program for assistance to federal, state and local agencies whereby a grant is provided by FEMA as an incentive for implementing mutually desired mitigation programs, as authorized by the Stafford Act and related federal regulations, plans and policies.

3.12 Historic Building or Structure shall mean any building or structure included on the national register of historic places, the state register of historic places or points of interest, or a local register of historic places, and any buildings and structures having historic significance within a recognized historic district.

3.13 Individual Assistance Program. A program for providing small grants to individuals and households affected by a disaster to offset loss or equipment, damage to homes, or the cot of relocation to another home, as authorized under the Stafford Act and related federal regulations.

3.14 In-Kind shall mean the same a the prior building or structure in size, height and shape, type of construction, number of units, general location and appearance.

3.15 Major Disaster shall mean a locally declared emergency also proclaimed as a state of emergency by the Governor of the State and by the President of the United States.

3.16 Multi-Agency Hazard Mitigation Team. A team of representatives from FEMA, other federal agencies, state emergency management agencies and related state and local agencies, formed to identify, evaluate and report on post-disaster mitigation needs.

3.17 Public Assistance Program. A program for providing reimbursement to federal, state and local agencies and non-profit organizations for repair and replacement of facilities lost or damaged in a disaster, as authorized under the Stafford Act and related federal regulations, plans and policies.

3.18 Reconstruction shall mean the rebuilding of permanent replacement housing, construction of large-scale public or private facilities badly damaged or destroyed in a major disaster, addition of major community improvements, and full restoration of a healthy economy.

3.19 Recovery shall mean the process by which most of private and public buildings and structures not severely damaged or destroyed in a major disaster are repaired and most public and commercial services are restored to normal.

3.20 Recovery Organization. An interdepartmental organization which coordinates city staff actions in planning and implementing disaster recovery and reconstruction functions.

3.21 Recovery Plan. A pre-event plan for post-disaster recovery and reconstruction, comprised of policies, plans, implementation actions, and designated responsibilities related to expeditious and orderly post-disaster recovery and rebuilding, as well as long-term mitigation.

3.22 Recovery Strategy. A post-disaster strategic program identifying and prioritizing major actions contemplated or under way regarding such essential recovery functions as business resumption, economic reinvestment, industrial recovery, housing replacement, infrastructure restoration, and potential sources of financing to support these functions.

3.23 Safety Element. An element of the comprehensive, long-term general plan for the physical development of a community which addresses protection of the community from unreasonable risks associated with the effects of earthquakes, landslides, flooding, wildland and urban fires, wind, coastal erosion, and other natural and technological disasters.

3.24 "Stafford Act" shall mean the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Public Law 93-288, as amended).

Section 4. Recovery Organization. There is hereby created the Recovery Organization, for the purpose of coordinating city actions in planning and implementing disaster recovery and reconstruction activities.

4.1 Powers and Duties. The Recovery Organization shall have such powers as enable it to carry out the purposes, provisions and procedures of this Chapter, as identified in this chapter.

4.2 Recovery Task Force. The Recovery Organization shall include a Recovery Task Force comprised of the following officers and members:

a. The Mayor (or county or town equivalent) who shall be Chair;
b. The City Manager (or county or town equivalent) who shall be Director and Vice-Chair;
c. The Assistant City Manager who shall be Deputy Director, and who shall act as Vice-Chair in the absence of the City Manager;
d. The City Attorney (or county or town equivalent) who shall be Legal Adviser;
e. Other members, including the Building Official, City Engineer, Community Development/Planning Director, Fire Chief, Emergency Management Coordinator, General Services Director, Police Chief, Public Works Director, Utilities Director, together with representatives from such other departments and offices as may be deemed necessary by the Chair or Director for effective operation;

Commentary. The formal structure of a recovery organization will vary from community to community. The department manager titles used obviously will vary widely. The important thing is inclusion of the broadest array of functions which may have a direct or indirect role in recovery and reconstruction. Also, formal leadership may vary by size and structure of local governmental organization. In a big-city environment, presence and availability of the Mayor or a Deputy Mayor may be important from a leadership standpoint, even though recovery in many instances is largely a staff-driven process. On the other hand, in a typical council-manager form of government, inclusion of the Mayor may not be very useful. The intent here is to provide a communications connection with the City Council as well as a ceremonial function.

4.3 Operations and Meetings. The Director shall have responsibility for Recovery Organization operations. When an emergency declaration is not in force, the Recovery Task Force shall meet monthly or more frequently, upon call of the Chair or Director. After a declaration of an emergency, and for the duration of that declared emergency period, the Recovery Task Force shall meet daily or as frequently as determined by the Director.

Commentary. The overall concept here is for the City Manager to run the recovery task force operations on behalf of the City Council, reserving the presence of the Mayor for those times when policy matters are being discussed or at critical junctures following a major disaster. In actuality, the City Manager inevitably becomes the pivotal party for informing and advising the City Council on recovery matters, interpreting Council policy and coordinating staff functions.

4.4 Succession. In the absence of the Director, the Assistant Directory shall serve as Acting Director and shall be empowered to carry out the duties and responsibilities of the Director. The Director shall name a succession of department managers to carry out the duties of the Director and Assistant Director, and to serve as Acting Director in the event of the unavailability of the Director and Assistant Director.

4.5 Organization. The Recovery Task Force may create such standing or ad hoc committees as determined necessary by the Director.

4.6 Relation to Emergency Management Organization. The Recovery Organization shall work in concert with the city Emergency Management Organization (or equivalent) which has interrelated functions and similar membership.

Commentary. As noted in the introductory paragraphs, there are certain fundamental differences in function which make it preferable to establish a recovery organization which can operate parallel to the emergency response organization. However, because of the inherent linkage of emergency preparedness and response with recovery, reconstruction and hazard mitigation functions, a close relationship must be

continuously maintained. For many purposes these overlapping organizations can meet and work jointly. The value of having a separate recovery organization is best recognized when hard core building, planning and redevelopment issues require extended attention during the pre-event planning phase or during the long months and years it is likely to take to fully rebuild.

Section 5. Recovery Plan. Before a major disaster, the Recovery Task Force shall prepare a pre-event plan for post-disaster recovery and reconstruction, referred to as the Recovery Plan, which shall be comprised of pre-event and post-disaster policies, plans, implementation actions, and designated responsibilities related to expeditious and orderly post-disaster recovery, rebuilding, and long-term hazard mitigation.

5.1 Recovery Plan Content. The Recovery Plan shall address policies, implementation actions and designated responsibilities for such subjects as business resumption, damage assessment, demolitions, debris removal and storage, expedited repair permitting, fiscal reserves, hazards evaluation, hazard mitigation, historical buildings, illegal buildings and uses, moratorium procedures, nonconforming buildings and uses, rebuilding plans, redevelopment procedures, relation to emergency response plan and comprehensive general plan, restoration of infrastructure, restoration of standard operating procedures, temporary and replacement housing, and such other subjects as may be appropriate to expeditious and wise recovery.

5.2 Coordination of Recovery Plan with FEMA and Other Agencies. The Recovery Plan shall identify relationships of planned recovery actions with those of state, federal or mutual aid agencies involved in disaster recovery, including but not limited to the Federal Emergency Management Agency (FEMA), the American Red Cross, the Department of Housing and Urban Development (HUD), the Small Business Administration (SBA), the Environmental Protection Administration (EPA), the Department of Transportation (DOT), the State Emergency Management Agency (or equivalent) and other entities which may provide assistance in the event of a major disaster. The Director shall distribute a draft copy of the plan to such agencies in sufficient time for comment prior to action on the Recovery Plan by the City Council.

Commentary. In contrast to most local emergency management organizations, FEMA has substantial recovery and reconstruction responsibilities. Since FEMA is the main source of funds made available by Congress under the Stafford Act for rebuilding private and public facilities, it is important to solicit from that agency as much advance information as can be obtained regarding post-disaster procedures essential to recovery and reconstruction.

5.3 Recovery Plan Adoption. Following formulation, the Recovery Plan shall be transmitted to the City Council for review and approval. The City Council shall hold one or more public hearings to receive comments from the public on the Recovery Plan. Following one or more public hearings, the City Council may adopt the

Recovery Plan by resolution, including any modifications deemed appropriate, or transmit the plan back to the Recovery Task Force for further modification prior to final action.

Commentary. Governing board adoption of this ordinance together with the pre-event plan is extremely important to its successful post-disaster implementation. The City Council needs to become comfortable with the concept of pre-event plan and ordinance adoption in order to feel confident in staff during post-disaster recovery operations. If Council adoption is not possible immediately because of the press of other business, look for opportunities to bring the plan and ordinance forward such as when a catastrophic disaster has struck in another jurisdiction.

5.4 Recovery Plan Implementation. The Director and Recovery Task Force shall be responsible for implementation of the plan both before and after a major disaster, as applicable. Before a declaration of emergency, the Director shall prepare and submit reports annually, or more frequently as necessary, to fully advise the City Council on the progress of preparation or implementation of the Recovery Plan. After a declaration of emergency in a major disaster, the Director shall report to the City Council as often as necessary on implementation actions taken in the post-disaster setting, identify policy and procedural issues, and receive direction and authorization to proceed with plan modifications necessitated by specific circumstances.

5.5 Recovery Plan Training and Exercises. The Recovery Task Force shall organize and conduct periodic training and exercises annually, or more often as necessary, in order to develop, convey and update the contents of the Recovery Plan. Such training and exercises will be conducted in coordination with similar training and exercises related to the Emergency Operations Plan.

Commentary. Clearly, training and exercises are functions which should happen on a joint, ongoing basis with the city's Emergency Management Organization. For greatest value, training and exercises should include careful attention to critical relationships between early post-disaster emergency response and recovery actions which condition long-term reconstruction, such as street closing and reopenings, demolitions, debris removal, damage assessment and hazards evaluation.

5.6 Recovery Plan Consultation with Citizens. The Recovery Task Force shall schedule and conduct community meetings, periodically convene advisory committees comprised of representatives of homeowner, business and community organizations, or implement such other means as to provide information and receive input from members of the public regarding preparation, adoption or amendment of the Recovery Plan.

5.7 Recovery Plan Amendments. During implementation of the Recovery Plan, the Director and the Recovery Task Force shall address key issues,

strategies and information bearing on the orderly maintenance and periodic revision of the plan. In preparing modifications to the plan, the Recovery Task Force shall consult with City departments, business and community organizations and other government entities to obtain information pertinent to possible Recovery Plan amendments.

5.8 Recovery Plan Coordination with Related (City, County) Plans. The Recovery Plan shall be prepared in coordination with related elements of the Comprehensive General Plan and Emergency Master Plan, or such other plans as may be pertinent. Such related plan elements shall be periodically amended by the City Council to be consistent with key provisions of the Recovery Plan, and vice versa.

Section 6. General Provisions. The following general provisions shall be applicable to implementation of this chapter following a major disaster:

6.1 Powers and Procedures. Following a declaration of local emergency in a major disaster and while such declaration is in force, the Director and the Recovery Task Force shall have authority to exercise powers and procedures authorized by this chapter, subject to extension, modification or replacement of all or portions of these provisions by separate ordinances adopted by the City Council.

6.2 Post-Disaster Operations. The Director shall direct and control post-disaster recovery and reconstruction operations, including but not limited to the following:

a. Activate and deploy damage assessment teams to identify damaged structures and to determine further actions which should be taken regarding such structures;
b. Activate and deploy hazards evaluation teams to locate and determine the severity of natural or technological hazards which may influence the location, timing and procedures for repair and rebuilding processes;
c. Maintain liaison with the City emergency operations organization and other public and private entities, such as FEMA, the American Red Cross, and the State Emergency Management Agency (or equivalent) in providing necessary information on damaged and destroyed buildings or infrastructure, natural and technological hazards, street and utility restoration priorities, temporary housing needs and similar recovery concerns;
d. Establish "one-stop" field offices located in or near impacted areas, staffed by trained personnel from appropriate departments, to provide information about repair and rebuilding procedures, issue repair and reconstruction permits, and provide information and support services on such matters as business resumption, industrial recovery, and temporary and permanent housing;
e. Activate streamlined procedures to expedite repair and rebuilding of properties damaged or destroyed in the disaster;

f. Recommend to the City Council and other appropriate entities necessary actions for reconstruction of damaged infrastructure;
g. Prepare plans and proposals for action by the City Council for redevelopment projects, redesign of previously established projects or other appropriate special measures addressing reconstruction of heavily damaged areas;
h. Formulate proposals for action by the City Council to amend the Comprehensive General Plan, Emergency Master Plan and other relevant pre-disaster plans, programs and regulations in response to new needs generated by the disaster;
i. Such other recovery and reconstruction activities identified in the Recovery Plan or by this chapter, or as deemed by the Director as necessary to public health, safety and well-being.

6.3 Coordination with FEMA and Other Agencies. The Director and Recovery Task Force shall coordinate recovery and reconstruction actions with those of state, federal or mutual aid agencies involved in disaster response and recovery, including but not limited to the Federal Emergency Management Agency (FEMA), the American Red Cross, the Department of Housing and Urban Development (HUD), the Small Business Administration (SBA), the State Emergency Management Agency (or equivalent) and other entities which provide assistance in the event of a major disaster. Intergovernmental coordination tasks including but not limited to the following:

a. Assign trained field personnel to provide information and logistical support to the FEMA Disaster Field Office;
b. Supply personnel to provide information support for FEMA Disaster Assistance Centers (DACs);
c. Participate in damage assessment surveys conducted in cooperation with FEMA and other entities;
d. Participate in the Multi-Agency Hazard Mitigation Team with FEMA and other entities;
e. Cooperate in the joint establishment with other agencies of one-stop service centers for issuance of repair and reconstruction permits, business resumption support, counseling regarding temporary and permanent housing, and other information regarding support services available from various governmental and private entities;
f. Coordinate within city government the preparation and submittal of Disaster Survey Reports (DSRs) to FEMA;
g. Determine whether damaged structures and units are within floodplains identified on Flood Insurance Rate Map (FIRM) maps and whether substantial damage has occurred;
h. Implement such other coordination tasks as may be required under the specific circumstances of the disaster.

Commentary. To provide direction for handling emergency response, relief and recover in relation to major disasters, Congress has enacted the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Public Law 93-288, as amended). A substantial portion of the Stafford Act is devoted to the means by which federal funds are distributed to persons, businesses, local governments and state governments for disaster relief and recovery. For most communities this is an important means by which disaster losses can be compensated, at least in part. Although insurance can be instrumental in person or business loss recovery for major hurricane, flood and fire disaster damage, it has little value for compensation from losses incurred from disasters for which insurance is too costly or difficult to obtain, such as for earthquake damage, and no value for circumstances which are uninsured. Some of the federal assistance is in the form of grants and loans, involving not only FEMA but also other agencies such as HUD and SBA. The federal government has become increasingly interested in promoting more effective means of coordinating post-disaster victim services as well as mitigating hazards having to do with land use and building construction. Consequently, federal assistance to localities in many instances is contingent upon the adjustment of local city or county recovery and hazard mitigation policies and practices. In other words, as with many other forms of more traditional assistance, the community may not always be able to do things its own way if it desires federal post-disaster assistance.

6.4 Consultation with Citizens. The Director and the Recovery Task Force shall schedule and conduct community meetings, convene ad hoc advisory committees comprised of representatives of business and community organizations, or implement such other means as to provide information and receive input from members of the public regarding measures undertaken under the authority of this chapter.

Commentary. One of the critical components in establishing a relatively successful relationship between local government and disaster victim organizations after the City of Oakland firestorm was the series of weekly meetings held in the affected area by the Assistant City Manager. Direct outreach to the community should be established in advance of a major disaster through neighborhood safety or similar programs conducted by fire and law enforcement officials, ideally in conjunction with preparation of a pre-event plan. Following a major disaster, proactive outreach is critical to establishing a two-way flow of information, without which controversy inherent in post-disaster settings can become severe.

Section 7. Temporary Regulations. The Director shall have the authority to administer the provisions of this section temporarily modifying provisions of the Municipal Code (or equivalent) dealing with building and occupancy permits, demolition permits, and restrictions on the use, development or occupancy of private property, provided that such action, in the opinion of the Director, is reasonably justifiable for protection of life and property, mitigation of hazardous conditions,

avoidance of undue displacement of households or businesses, or prompt restoration of public infrastructure.

Commentary. The following temporary regulations are at the heart of the recovery process. Although existing state law or city ordinances may already authorize some of these functions, it is preferable to have a single source of locally adopted ordinance which, among other things, identifies regulatory functions related to post-disaster recovery, clearly places responsibility for implementation, and provides a coordinated rationale for city intervention in case of challenge. Among the components of these temporary regulations are provisions dealing with duration, damage assessment, development moratoria, debris clearance, permit expediting, temporary uses and repairs, deferral of fees, nonconforming buildings and uses, condemnation and demolition, and temporary and permanent housing. Each of these components needs careful examination and, as appropriate, adjustment based on local policies and conditions. However, pre-event adoption of this ordinance adjusted to take into account local circumstances provides a solid basis for initial post-disaster action. It is not possible to anticipate the exact character, magnitude and distribution of damage from a major disaster. However, pre-adopted regulations provide a basis for more efficient action which is substantially less subject to policy reversals and other uncertainties typically found in cities which have not prepared in this manner.

7.1 Duration. The provisions of this section shall be in effect for a period of six months from the date of a local emergency declaration following a major disaster or until termination of a state local emergency, whichever occurs later, or until these provisions are extended, modified, replaced by new provisions, or terminated, in whole or in part, by action of the City Council through separate ordinances.

Commentary. This provision allows for flexibility in the duration of application of the temporary regulations, so that any portion can be terminated, modified, or extended depending upon local circumstances. It also reflects a recognition that "temporary" regulations may be in effect for an extended period of time beyond either termination of the local emergency or passage of the six month period. In reality, such temporary provisions are often in effect for several years after the disaster, as necessary.

7.2 Damage Assessment. The Director shall direct damage assessment teams having authority to conduct field surveys of damaged structures and post placards designating the condition of such structures as follows:

a. Inspected—Lawful Occupancy Permitted is to be posted on any building in which no apparent structural hazard has been found. This does not mean there are not other forms of damage which may temporarily affect occupancy.

Commentary. This is commonly known as the "green tag" placard.

b. **Restricted Use** is to be posted on any building in which damage has resulted in some form of restriction to continued occupancy. The individual posting this placard shall note in general terms the type of damage encountered and shall clearly and concisely note the restrictions on continued occupancy.

Commentary. This is commonly known as the "yellow tag" placard.

c. **Unsafe—Do Not Enter or Occupy** is to be posted on any building that has been damaged to the extent that continued occupancy poses a threat to life safety. Buildings posted with this placard shall not be entered under any circumstances except as authorized in writing by the department that posted the building or by authorized members of damage assessment teams. The individual posting this placard shall note in general terms the type of damage encountered. This placard is not to be considered a demolition order.

Commentary. This is commonly known as the "red tag" placard.

d. This chapter and section number, the name of the department, it's address, and phone number shall be permanently affixed to each placard.

e. Once a placard has been attached to a building, it shall not be removed, altered or covered until done so by an authorized representative of the department or upon written notification from the department. Failure to comply with this prohibition will be considered a misdemeanor punishable by a $300 fine.

Commentary. Damage assessment and the placement of placards identifying whether or not buildings are safe or unsafe to occupy are two functions having perhaps the most profound effects on life, property and community recovery than any other within the post-disaster decision and action sequence towards which the provisions of these temporary regulations are directed. Damage assessment is undertaken by various entities following a major disaster, usually the city and FEMA. There is at least a twofold purpose for these inspections. One is to determine the degree of structural damage of each building and notify the public about the relative safety of entry and occupancy. This has been a long-standing duty under local government public health and safety responsibilities with which building departments are usually very familiar.

The other is to quickly estimate the approximate replacement costs of damaged buildings and other property in order to inform the state and federal governments of dollar amounts needed for emergency legislative authorizations. The latter purpose is fraught with difficulty to the extent that hurriedly conducted damage assessments can miss substantial elements of damage and corresponding costs. Moreover, local

expertise tends to be limited in the area of deploying common standards and procedures for determining structural damage in order to assess damage in a truly comparable manner. Additionally, most local governments have not yet invested in damage assessment reporting techniques which take advantage of advances in information technology, such as hand-held digital recording devices which can be downloaded by telephone or satellite to a central computer to quickly assemble data from the field.

The most important element of all these concerns is the establishment of standard identification of structural damage both in gross general terms reflected in the red, yellow and green tag placard systems, as well as in the details recorded regarding each building. This ordinance reflects only the standard placard system, leaving to the building professionals the means by which such determinations are made and recorded in detail. The source of the language for the placard system in this model ordinance is a publication by the California Governor's Office of Emergency Services titled ***Model Ordinances for Post-Disaster Recovery and Reconstruction****. The procedure used to make these basic safety distinctions in the California model ordinance are based on detailed post-disaster inspection methods described by the Applied Technology Council in a publication titled* ***ATC-20, Procedures for Postearthquake Safety Evaluation of Buildings****, and in the State of California's publication titled* ***Post-Disaster Safety Assessment Plan****. While somewhat oriented toward structural damage from earthquakes due to California's known seismicity, the placard system is adaptable to other disasters. For additional references regarding damage assessment safety notifications, the reader is referred to the International Conference of Building Officials and similar organizations.*

7.3 Development Moratorium. The Director shall have the authority to establish a moratorium on the issuance of building permits, approval of land use applications or other permits and entitlements related to the use, development and occupancy of private property authorized under other chapters and section of the Municipal Code and related ordinances, provided that, in the opinion of the Director, such action is reasonably justified for protection of life and property and subject to the following:

a. **Posting**—Notice of the moratorium shall be posted in a public place and shall clearly identify the boundaries of the area in which a moratorium is in effect as well as the exact nature of the development permits or entitlements which are temporarily held in abeyance;

b. **Duration**—The moratorium shall be in effect subject to review by the City Council at the earliest possible time, but no later than 90 days, at which time the Council shall take action to extend, modify or terminate such moratorium by separate ordinance.

Commentary. After disasters around the world, the prevailing sentiment often is to act quickly to replicate pre-disaster building patterns. In many instances, this sentiment

prevails as policy despite the presence of a severe natural hazard condition, thus reinforcing the chances of repeating the disaster. The most notable example has been the rebuilding of homes in the Turnagain Heights area on land severely deformed by a landslide in the 9+ Magnitude 1964 Anchorage earthquake.

To prevent or lessen the chances of repetition of the disaster, it may be necessary for a city to interrupt and forestall repair and rebuilding long enough to assess rebuilding options and/or to determine effective means of mitigation. The city may wish to establish an emergency moratorium on issuance of repair and rebuilding permits or on land use approvals in areas where severely hazardous conditions are identified. The hazard may be newly detected, as in a post-earthquake circumstance where the pattern of damage or ground deformation may indicate the need for geologic studies to clearly identify such hazards as landslides, liquefaction or fault rupture. On the other hand, the hazardous condition may be a well known cause of prior damaging disasters, as in the Oakland Hills firestorm area which had a long history of previous fires, or communities affected by the 1993 Midwestern floods where prior flood control and floodproofing efforts were proven ineffective.

A moratorium on development may be important for a city to undertake from the standpoint of enlightened public policy. However, since such action may be extremely controversial and unpopular, it is important to lay the ground work with the community in advance, if possible. This subsection provides prior authorization through adoption of this ordinance before a major disaster, whereby city staff can act expeditiously in a post-disaster setting to forestall premature issuance of permits in areas shown to be hazardous. Such action is necessarily subject to Council review, ratification, modification or termination.

7.4 Debris Clearance. The Director shall have the authority to remove from public rights-of-way debris and rubble, trees, damaged or destroyed cars, trailers, equipment, and other private property, without notice to owners, provided that in the opinion of the Director such action is reasonably justifiable for protection of life and property, provision of emergency evacuation, assurance of firefighting or ambulance access, mitigation of otherwise hazardous conditions, or restoration of public infrastructure.

Commentary. Although clearance of privately owned debris is routinely considered a function of local government, it can become very controversial where owners take the position that such property is salvageable and has value (e.g., used brick after an earthquake). Pre-event adoption of such a provision reinforces the expectation that debris clearance functions will be carried out decisively, thus minimizing a problem otherwise compounded by city hesitation or ambiguity of intention.

7.5 One-Stop Center for Permit Expediting. The Director shall establish a one-stop center, staffed by representatives of pertinent departments, for the purpose of establishing and implementing streamlined permit processing to

expedite repair and reconstruction of buildings, and to provide information support for provision of temporary housing and encouragement of business resumption and industrial recovery. The Director shall establish such center and procedures in coordination with other governmental entities which may provide services and support, such as FEMA, SBA, HUD, or the State Emergency Management Agency (or equivalent).

Commentary. One-stop permit centers have become more common with recent major disasters, often combining the presence of multiple agencies to provide better coordination of information which disaster victims may need in order to rebuild. A prime example was the Community Restoration and Development Center established by the City of Oakland shortly after the 1991 firestorm and operated until mid-1994 with financial support from FEMA. Benefits to be gained for establishing a special one-stop center include not only accelerated review but also integration of information and permitting functions. Setting up a special team of specialists working exclusively on repair and rebuilding permit issues has the added advantage of insulating normal development review from disruption by the recovery process and vice versa.

7.6 Temporary Use Permits. The Director shall have the authority to issue permits in any zone for the temporary use of property which will aid in the immediate restoration of an area adversely impacted by a major disaster, subject to the following provisions:

a. **Critical Response Facilities**—Any police, fire, emergency medical or emergency communications facility which will aid in the immediate restoration of the area may be permitted in any zone for the duration of the declared emergency;

b. **Other Temporary Uses**—Temporary use permits may be issued in any zone, with conditions, as necessary, provided written findings are made establishing a factual basis that the proposed temporary use: 1) will not be detrimental to the immediate neighborhood; 2) will not adversely affect the Comprehensive General Plan or any applicable specific plan; and 3) will contribute in a positive fashion to the reconstruction and recovery of areas adversely impacted by the disaster. Temporary use permits may be issued for a period of one year following the declaration of local emergency and may be extended for an additional year, to a maximum of two years from the declaration of emergency, provided such findings are determined to be still applicable by the end of the first year. If, during the first or second year, substantial evidence contradicting one or more of the required findings comes to the attention of the Director, then the temporary use permit shall be revoked.

Commentary. Most zoning ordinances have no provisions for temporary use of property following a disaster. A few allow temporary placement of mobile homes on

residentially zoned sites pending reconstruction of a residence. Time limits vary, but are usually for a two-year period. After a major disaster, special latitude may be needed, however, to support various recovery needs. Care must be taken not to set precedents which will erode or destroy a pre-existing pattern of zoning which the city may wish to protect.

The language within this section is modeled after provisions of the Los Angeles recovery ordinance adopted after the Northridge earthquake, titled ***Temporary Regulations Relating to Land Use Approvals for Properties Damaged in a Local Emergency****. That ordinance is geared toward the needs of a large and diverse city. Smaller communities may wish to restrict temporary uses to those already allowed by the zone in which they are located, limiting the provision to temporary structures such as tents, domes, or mobile units.*

7.7 Temporary Repair Permits. Following a disaster, temporary emergency repairs to secure structures and property damaged in the disaster against further damage or to protect adjoining structures or property may be made without fee or permit where such repairs are not already exempt under other chapters of the Municipal Code. The building official must be notified of such repairs within ten working days, and regular permits with fees may then be required.

Commentary. This provision is specifically written for repairs which may not be exempt under standard building code permit exemptions but which are justifiable from a public health and safety standpoint to avoid further damage to property after a disaster. It is modeled after a provision of a post-disaster rebuilding ordinance adopted in 1992 by the County of San Bernardino shortly after the Landers-Big Bear earthquake. Written before the earthquake, the ordinance was based on a pre-event study titled ***Post-Disaster Rebuilding Ordinance and Procedures****, which included a survey of top managers and elected officials regarding various post-disaster rebuilding provisions, such as for nonconforming buildings and uses. Because of the pre-event involvement of top managers and elected officials, it was adopted after the earthquake with no controversy.*

7.8 Deferral of Fees for Reconstruction Permits. Except for temporary repairs issued under provisions of this chapter, all other repairs, restoration and reconstruction of buildings damaged or destroyed in the disaster shall be approved through permit under the provisions of other chapters of this Code. Fees for such repair and reconstruction permits may be deferred until issuance of certificates of occupancy.

Commentary. Pressure to waive or defer processing fees frequently arises after a disaster when victims are unsure of their sources of financing for rebuilding. It is inadvisable to succumb to pressures to waive fees entirely due to the need for cost recovery for disaster related services at a time when there may be substantial uncertainties in revenue flows. Also, it is helpful to buy time to determine the degree

to which sources other than the victims may help offset fee costs. For example, sometimes insurance will cover the cost of processing fees. Also, such costs have been covered by FEMA. Deferral of fees until occupancy permit issuance provides time in which such alternate sources can be worked out, without sacrificing the basic revenue flow to the city treasury. This provision is modeled after similar language in the Los Angeles temporary regulations.

7.9 Nonconforming Buildings and Uses. Buildings damaged or destroyed in the disaster which are legally nonconforming as to use, yards, height, number of stories, lot area, floor area, residential density, parking or other provisions of the Municipal Code may be repaired and reconstructed in-kind, provided that:

a. the building is damaged in such a manner that the structural strength or stability of the building is appreciably lessened by the disaster and is less than the minimum requirements of the Municipal Code for a new building;
b. the cost of repair would exceed 50 percent of the replacement cost of the building;
c. all structural, plumbing, electrical and related requirements of the Municipal Code are met at current standards;
d. all natural hazard mitigation requirements of the Municipal Code are met;
e. reestablishment of the use or building is in conformance with the national Flood Insurance Rate Map requirements and procedures;
f. the building is reconstructed to the same configuration, floor area, height, and occupancy as the original building or structure;
g. no portion of the building or structure encroaches into an area planned for widening or extension of existing or future streets as determined by the comprehensive general plan or applicable specific plan;
h. repair or reconstruction shall commence within two years of the date of the declaration of local emergency in a major disaster and shall be completed within two years of the date on which permits are issued.

Nothing herein shall be interpreted as authorizing the continuation of a nonconforming use beyond the time limits set forth under other sections of the Municipal Code that were applicable to the site prior to the disaster.

Commentary. No issue can be more vexing to planners than whether or not to encourage reestablishment of nonconforming uses and buildings after a major disaster. Planners have sought for decades to write strict provisions in zoning ordinances designed to gradually eliminate nonconforming uses or buildings as they were abandoned, changed owners, or were damaged by fire, wind, or water. The latter provisions normally prohibit reestablishment of nonconforming uses and buildings where damage exceeds a certain percentage of replacement cost, most often 50%. This approach is logical, orderly and normally equitable when weighing

community interests balanced with those of the property owner. However, the thinking behind such provisions has been geared to incremental adjustments or termination of such uses over time, not to sudden catastrophic circumstances forcing attention to disposition of such uses as a class at a single point in time.

In theory, disasters represent an opportunity to upgrade conditions such as parking deficiencies attributable to the nonconforming status of a building or use. More fundamentally, disasters are seen as an opportunity to eliminate uses which conflict with the prevailing pattern in a neighborhood but which remain because of legal nonconforming status—for example, scattered industrial uses in a residentially zoned neighborhood. In reality, however, after a major disaster local governments are normally beset by severe pressures from property owners and other community interests to reestablish the previous development pattern exactly as it previously existed, including nonconforming buildings and uses. Moreover, such pressures extend beyond the demand to reestablish nonconforming buildings or uses to include waiver of current building plumbing, and electrical code provisions to the standards in place at the time of construction. From a risk management, liability exposure or public safety standpoint, acquiescence to the reduction of standards in the face of a known hazard can be seen as clearly unacceptable by city councils. However, zoning provisions hindering reestablishment of nonconforming buildings and uses tend to be more arguable and are more likely to be modified by city councils under extreme pressures of the moment to restore the prior status quo.

In recognition of such pressures, this model ordinance language offers a straightforward tradeoff which allows reestablishment of a nonconforming use or building in turn for strict adherence to structural, plumbing and electrical code and related hazard mitigation requirements. The language assumes the existence of a commonly found provision in the Municipal Code authorizing repair or reestablishment of a nonconforming use or building where damage is less than 50% of the replacement cost. It also assumes that the building was substantially weakened by the disaster and is below present code requirements.

This compromise approach recognizes that its application may require the unwelcome decision to accept continuation of disorderly land use patterns, unless a solution can be found through redevelopment or rezoning. Instead, it replaces a high value on life safety. This is an uneasy balance not unlike integration of other health and safety measures such as unaesthetic balance not unlike integration of other health and safety measures such as unaesthetic transportation facilities or placement of locally unacceptable land uses (LULUs) like sewer plants into the community pattern.

It is important to note that the language of these provisions includes important limitations which tend to limit the economic incentive to reestablish the nonconforming use or building. 1) It does not extent any previously stipulated life of the nonconforming use—an important disincentive if the costs of replacement cannot be offset by insurance, FEMA assistance, SBA loans or other sources of financial support.

2) It does not allow the extent of nonconformance to be increased over what existed prior to the disaster, thwarting another common pressure. 3) It requires strict adherence to existing structural, plumbing, electrical and other requirements of the Municipal Code as well as any street setbacks stipulated within the comprehensive plan circulation element and related ordinances. This may be especially costly from a structural standpoint, for example, when replacing previously unreinforced masonry buildings after a devastating earthquake. 4) It recognizes that compliance with more stringent hazard mitigation requirements may be needed, especially in cases involving increased on-site hazards because of fault rupture, landsliding, coastal erosion, or severe flooding where upgrading to current structural, plumbing and electrical code requirements isn't enough. Compliance with the latter provision may also be sufficiently costly to discourage reestablishment of the use or other nonconforming feature.

The relative importance of post-disaster reestablishment of nonconforming uses and buildings may vary greatly from jurisdiction to jurisdiction. Therefore, the most useful time to assess this aspect of post-disaster recovery is before a major disaster, in the course of pre-event planning. Education of the city council in advance can help lessen post-disaster tendencies to compromise critical hazard mitigation and public safety requirements, notwithstanding the outcome on nonconforming use and building requirements.

Section 8. Demolition of Damaged Historic Buildings. The Director shall have authority to order the condemnation and demolition of buildings and structures damaged in the disaster under the standard provisions of the Municipal Code, except as otherwise indicated below:

8.1 Condemnation and Demolition. Within ___ days after the disaster, the building official shall notify the State Historic Preservation Officer that one of the following actions will be taken with respect to any building or structure determined by the building official to represent an imminent hazard to public health and safety, or to pose an imminent threat to the public right of way:

a. Where possible, within reasonable limits as determined by the building official, the building or structure shall be braced or shored in such a manner as to mitigate the hazard to public health and safety or the hazard to the public right of way;

b. Whenever bracing or shoring is determined not to be reasonable, the building official shall cause the building or structure to be condemned and immediately demolished. Such condemnation and demolition shall be performed in the interest of public health and safety without a condemnation hearing as otherwise required by the Municipal Code. Prior to commencing demolition, the building official shall photographically record the entire building or structure.

8.2 Notice of Condemnation. If, after the specified time frame noted in Subsection 8.1 of this chapter and less than 30 days after the disaster, a historic building or structure is determined by the building official to represent a hazard to the health and safety of the public or to pose a threat to the public right of way, the building official shall duly notify the building owner of the intent to proceed with a condemnation hearing within ____ business days of the notice in accordance with Municipal Code Section ___; the building official shall also notify FEMA, in accordance with the National Historic Preservation Act of 1966, as amended, of the intent to hold a condemnation hearing.

8.3 Request to FEMA to Demolish. Within 30 days after the disaster, for any historic building or structure which the building official and the owner have agreed to demolish, the building official shall submit to FEMA, in accordance with the National Historic Preservation Act of 1966, as amended, a request to demolish. Such request shall include all substantiating data.

8.4 Historic Building Demolition Review. If after 30 days from the event, the building official and the owner of a historic building or structure agree that the building or structure should be demolished, such action will be subject to the review process established by the National Historic Preservation Act of 1966, as amended.

Commentary. One of the more difficult aspects of post-disaster response and recovery in older communities is the existence of damaged historically significant structures. Sine these can be very old, measures needed to make them structurally sound may be more difficult and costly and complicated than normal. Because of the emotion frequently attached to this issue and the often widely conflicting views, community controversy can erupt when a badly damaged historical structure is subject to demolition. Therefore, it is wise to have language already in place to guide the planning and building officials involved.

Because of such problems with seemingly premature or unjustifiable demolition of historic structures in previous disasters, the National Historic Preservation Act of 1966, as amended, identifies steps that must be taken by a jurisdiction or owner to mitigate public health and safety hazards resulting from disaster-caused damage. The intent is to establish predictable rules by which proposed demolitions, except in extreme cases of danger to the public, can be reviewed by state and federal officials in order to provide time to identify options for preservation of a damaged historic building or structure. The review process is also intended to discourage hasty demolition action by local officials when such action may not be justified.

The preceding language is adapted from California's ***Model Ordinances for Post-Disaster Recovery and Reconstruction****. This language supplements provisions of the* ***Uniform Code for the Abatement of Dangerous Buildings*** *by providing specific time frames and actions for abatement of hazards created by damage to*

historic buildings. The important element of local judgment here is the establishment of a specific time frame for declaring a structure an imminent hazard to public health and safety justifying immediate demolition without a condemnation hearing. Such time frames are generally from three to five days, though sometimes stretched to ten. After the established time frame, the threat may no longer be justified as imminent and, therefore, the remaining procedures kick in.

Section 9. Temporary and Permanent Housing. The Director shall assign staff to work with FEMA, SBA, HUD, the State Emergency Management Agency (or equivalent) and other appropriate governmental and private entities to identify special programs by which provisions can be made for temporary or permanent replacement housing which will help avoid undue displacement of people and businesses. Such programs may include deployment of mobile homes and mobile home parks under the temporary use permit procedures provided in Section 7 of this chapter, use of SBA loans and available Section 8 and Community Development Block Grant funds to offset repair and replacement housing costs, and other initiatives appropriate to the conditions found after a major disaster.

Commentary. The issue of post-disaster temporary and permanent replacement housing has grown to one of critical dimensions sine the Loma Prieta earthquake. After that earthquake, many displaced low-income occupants of damaged or destroyed housing simply disappeared—a common pattern following many disasters. Relatively little real progress has been made since then in finding effective ways by which to handle this issue on a broad scale. For example, after the Northridge earthquake, HUD became active immediately in attempting to assist localities in dealing with housing issues. Available resources were insufficient to cover the cost of much of the replacement housing needed. Housing issues were extremely complex. Low-moderate income rental housing replacement problems were somewhat alleviated by the existence of a high rate of apartment vacancies. However, recession-generated housing devaluation combined with substantial damage costs altered loan-to-value ratios to uneconomical levels. Repairs of single family and multifamily buildings dragged out for many months due to lending, engineering, and permitting problems. As a consequence, some middle-income households simply walked away from mortgages. The most visible evidence of earthquake-induced housing impacts were the large condominium and apartment complexes which remained in a fenced-off, unrepaired state until financing and repairs began to catch up two years later.

For these reasons, this section is essentially a placeholder for language which preferably should be made more specific on the basis of a pre-event plan for post-disaster recovery and reconstruction which takes into account the level of local housing vulnerability. For example, a community with a long history of flooding may have developed temporary shelter arrangements, such as in school gymnasiums, sufficient for short-term displacement. If there are no other hazards present, that community may not need to consider replacement housing. Whereas a community in an earthquake hazard prone area with a large portion of its housing inventory in

unreinforced masonry (URM) construction should consider both temporary shelters and interim housing such as mobile homes with the expectation that several years will be needed for replacement housing to be built.

A great deal more research is needed to find satisfactory solutions for prompt, efficient provision of both interim and replacement housing. Clearly, the magnitude of the Northridge housing problems caught public and private sector institutions off-guard. Little is yet understood regarding issues such as the most effective means by which to deal with damaged condominiums or the effect of the secondary mortgage market on housing repair and replacement. With downsizing of federal budgets in future years, this issue will become more critical since levels of support could be diminished. Also needed is more intensive research on feasible incentives for retrofitting a substantial portion of the existing housing stock to reduce vulnerability and risk. This is true not only for California and other western states normally associated with earthquake risk, but also for Midwestern and southeastern states under threat of a major earthquake on the New Madrid Fault.

Section 10. Hazard Mitigation Program. Prior to a major disaster, the Director shall establish a comprehensive hazard mitigation program, which includes both long-term and short-term components:

10.1 Safety Element. The long-term component shall be prepared and adopted by resolution of the City Council as the safety element of the City Comprehensive General Plan, for the purpose of enhancing long-term safety against future disasters. The safety element shall identify and map the presence, location, extent and severity of natural hazards, such as:

a. severe flooding;
b. wildland and urban fires;
c. seismic hazards such as ground shaking and deformation, fault rupture, liquefaction, tsunamis and dam failure;
d. slope instability, mudslides, landslides and subsidence;
e. coastal erosion;
f. hurricanes and other high winds;
g. technological hazards, such as oil spills, natural gas leakage and fires, hazardous and toxic materials contamination, nuclear power plant and radiological accidents.

The safety element shall determine and assess the community's vulnerability to such known hazards and shall propose measures to be taken both before and after a major disaster to mitigate such hazards.

Commentary. Although California may be viewed by some citizens in other parts of the country as perhaps atypical when considering life styles, ideas, the arts, or politics, it nevertheless has been the source of much forward-looking planning legislation and has recently become the site of a series of major natural disasters from which important post-disaster response and recovery lessons are being learned. One of the

far-seeing components of planning legislation in California is the mandatory general plan safety element, which became a requirement after the 1971 Sylmar earthquake. Now, over twenty years after the passage of that legislation, virtually all California cities have adopted safety elements as part of their comprehensive general plans, and many have implemented them in one specific way or another which has helped mitigate recognized hazards.

The safety element concept can be adapted for use in many other states to help localities deal more directly with significant local hazards. Its great value is the establishment of safety considerations at the policy level and the development of hazard mapping which can serve as an undergirding for specific regulations. This can be helpful in providing greater legal defensibility of regulations establishing substantial restrictions on the use of portions of properties subject to a natural hazard, such as landslides, flooding or beach erosion. Such considerations are important in taking into account the after effects of the ***Lucas*** *decision in the planning community.*

This concept also represents a proactive approach to hazard mitigation which can be portrayed locally as far preferable as an instrument of local control to measures which state or federal agencies may seek to impose in a post-disaster setting once substantial damage has been done. Although federal hazard mitigation requirements may become inevitable where federal reimbursements are sought locally, development of local safety elements may prove a useful means of preparing the community and perhaps averting the damage which might otherwise justify stronger, more costly mitigation requirements.

There is a growing body of knowledge about the nature of many of the hazards identified in this language, yet there remains a need for further research on how to integrate this knowledge in planning practice. A need exists for more definitive guidelines on how to mitigate many of these hazards through community design and site layout. For instance, with respect to wind, it was found on the Island of Kauai following Hurricane Iniki that homes placed along the windward edge of bluffs suffered greater damage than homes that were set back. It was also found that directional placement of roof overhangs in relation to prevailing direction of storm winds was important to the degree of damage. Such practical community design knowledge on wind effects should be extended and integrated with research on other hazards. Much needed is research material providing guidance on mitigation through community design for all natural hazards.

10.2 Short-Term Action Program. A short-term hazard mitigation program shall be included in the Recovery Plan. It shall be comprised of hazard mitigation program elements of highest priority for action, including preparation and adoption of separate ordinances dealing with specific hazard mitigation and abatement measures, as necessary. Such ordinances may require special site planning, land use and development restrictions or structural measures in areas affected by flooding,

urban/wildland fire, wind seismic or other natural hazards, or remediation of known technological hazards such as toxic contamination.

Commentary. This provision extends the safety element concept into the pre-event planning for post-disaster recovery and reconstruction process, identifying key measures which would have the most value for short-term implementation. Some of these measures, such as special ordinances related to flood plain management may already be in place. The concept here is to look beyond measures that are in place to determine others which are critically needed and to move forward toward their implementation.

10.3 Post-Disaster Actions. Following a major disaster, the Director shall participate in the Multi-Agency Hazard Mitigation Team with FEMA and other entities, as called for in Section 409 of the Stafford Act and related federal regulations. As appropriate, the Director may recommend to the City Council that the City participate in the Hazard Mitigation Grant Program, authorized in Section 404 of the Stafford Act in order to partially offset costs of recommended hazard mitigation measures.

Commentary. This provision acknowledges FEMA programs presently operating under the Stafford Act and corresponding federal regulations. FEMA has published guidelines relative to local implementation of these regulations. More recently, FEMA has initiated a nationwide effort toward increasing emphasis on hazard mitigation as a means of reducing disaster losses. A series of forums sponsored by FEMA in many cities throughout the country will lead to the publication of the National Mitigation Strategy, designed to put mitigation practice on a more proactive footing.

10.4 New Information. As new information is obtained regarding the presence, location, extent, location, and severity of natural or technological hazards, or regarding new mitigation techniques, such information shall be made available to the public, and shall be incorporated as soon as practicably possible within the Comprehensive General Plan safety element and the Recovery Plan through amendment.

Section 11. Recovery and Reconstruction Strategy. At the earliest practicable time following the declaration of local emergency in a major disaster, the Director and the Recovery Task Force shall prepare a strategic program for recovery and reconstruction.

11.1 Functions. To be known as the Recovery Strategy, the proposed strategic program shall identify and prioritize major actions contemplated or under way regarding such essential functions as business resumption, economic reinvestment, industrial recovery, housing replacement, infrastructure restoration, and potential sources of financing to support these functions.

11.2 Review. The Recovery Strategy shall be forwarded to the City Council for review and approval following consultation with FEMA, other governmental agencies, and business and citizen representatives. The Recovery Strategy shall provide detailed information regarding proposed and ongoing implementation of initiatives necessary to the expeditious fulfillment of critical priorities and will identify amendment of any other plans, codes or ordinances which might otherwise contradict or otherwise block strategic action. The Director shall periodically report to the City Council regarding progress toward implementation of the Recovery Strategy, together with any adjustments which may be called for by changing circumstances and conditions.

Commentary. The concept of this provision is to structure the flow of local post-disaster recovery and reconstruction actions around a short-term strategy which extends the pre-event plan into greater detail at the earliest possible time after a major disaster. This may provide absolutely essential to the extent that damage conditions differ substantially from those anticipated as part of the pre-event plan. In any case, development of such a strategy in the early days of recovery has the special benefit of adding a proactive emphasis to the recovery process to counter the overwhelmingly reactive context. It can be updated as often as necessary as experience is gained and new issues emerge. It also has the added benefit of providing a source from which the pre-event recovery plan and related plans can later be readily updated.

Section 12. Severability. If any provision of this chapter is found to be unconstitutional or otherwise invalid by any court of competent jurisdiction, such invalidity shall not affect the remaining provisions which can be implemented without the invalid provision, and, to this end, the provisions of this ordinance are declared to be severable.

APPENDIX M

July 2004

City of Redmond

Hazard Mitigation Plan

Document Two:

Hazard Identification Vulnerability Analysis (HIVA)

HAZARD IDENTIFICATION VULNERABILITY ANALYSIS (HIVA)

Table of Contents

EXECUTIVE SUMMARY

The City of Redmond is susceptible to many natural, technological, and human-caused hazards. Knowledge of these hazards, their frequency, and the community's vulnerability to them allows the community, emergency managers, police, fire, and medical agencies to better assess their risks associated to the present hazards and to plan and prepare for their consequences.

The purpose of this document is twofold:

1. To provide a basic level of knowledge and limited analysis of the hazards posing a threat to the City of Redmond.
2. To serve as base document for the City Comprehensive Land Use Plan, the Hazard Mitigation Plan, and Comprehensive Emergency Management Plan.

This document represents an elementary review of available published material. It is a summary of the relevant information needed to allow a subjective evaluation of the risk posed by certain hazards. It is not, nor is it intended to be, a rigorous or scientific analysis.

Relative Risk Assessment

Based on the individual hazard profiles and risk assessments contained herein, the project team has ranked the risks according to hazards.

1. Earthquake
2. Landslide
3. Flooding
4. Winter Storms
5. Terrorism

Since a major earthquake is very probable in the Cascadia Region within the next 25 years with anticipated severe impacts to the region at large, including the entire Redmond population, this hazard is given the highest risk rating. Structures located on soft alluvial soils, along or below steep slopes and along the Lake Sammamish shoreline are particularly vulnerable in an earthquake and in the event of an earthquake's many secondary hazards such as landslide, fire, and seiche.

Landslides are assigned the second highest risk rating, as Redmond topography is characterized by several steep slopes, has experienced heavy mudslides in recent history, and can be triggered by several probable events such as earthquake and heavy rains. While impacts are tempered somewhat by quality engineering and construction practices, as well as ample vegetation structure, this hazard is given a medium risk rating overall.

Flooding risk exists but varies by location, impact, and source. There is a high probability of low impact flooding along Bear Creek and Evans Creek, and thus a low risk rating. There is low probability of low impact flooding along the Sammamish River, and thus a low risk rating is assigned. There is a low probability of low impact flooding along the shores of Lake Sammamish, and thus a low risk rating is assigned for flooding in this area.

Terrorism and Winter Storms are tied for fourth and fifth highest risk rating. While Terrorism is a relatively infrequent event, its probability seems to be increasing. Given that Redmond is an "international crossroads" of sorts, with a number of multinational corporate headquarters located within its boundaries, we have assigned a high vulnerability rating for focused populations that are potential "targets" for terrorist activity.

Hazard	Hazard Severity + Location + Frequency/Probability	Vulnerability Natural + Manmade + Systems	Total Risk Hazard Risk * Vulnerability /Capability	Page
Drought	Moderate	Low	Low	5
Earthquake	Moderate	High	Moderate -> High	8
Epidemic	Low -> Mod Severity Low -> Mod Probability	Low -> High Impact	Low	12
Flooding	Bear & Evans Cr. – high Sammamish R. – low L. Sammamish – low	Low Low Low	Moderate Low Low	15
Hazardous Materials	Low -> High	Low	Low ->Moderate	20
Heat Wave	Low	Moderate	Low	22
Landslide	High	Moderate	Moderate -> High	24
Terrorism	Low -> Moderate	Low -> Moderate (Depends on target)	Moderate	27
Wildfire	Low -> Moderate (Seasonal)	Low -> Moderate (Depends on if drought)	Low -> Moderate	29
Winter Storm	High	Low	Moderate	33

UNDERSTANDING RISK RATINGS

To make the analysis more useful, adjective descriptors (High, Medium, Low) are established for each hazard's probability-of-occurrence and the area's vulnerability in the event of the hazard. A risk rating is assigned on the probability of a hazard occurring over the next 25 years. This interval was chosen because it is the long-term recurrence interval of a dangerous earthquake, the hazard of greatest risk to the City of Redmond. A final risk rating is assigned based on a subjective estimate of their combination and ultimately will help focus the emergency management program on the events with greatest potential risk.

A “High” risk rating warrants major program effort to prepare for, respond to, recover from, and mitigate against the hazard. A high risk rating for a hazard means that the hazard has a high probability of occurrence, and the entire population of Redmond is vulnerable to the hazard.

A “Medium” risk rating warrants modest program effort to prepare for, respond to, recover from, and mitigate against the hazard. A medium risk rating for a hazard means that the hazard has a moderate probability of occurrence, and/or only a part of the entire population of Redmond is vulnerable to the hazard.

A “Low” risk rating warrants no special effort to prepare for, respond to, recover from, or mitigate against the hazard beyond general awareness training. A low risk rating for a hazard means that the hazard has a low probability of occurrence, and/or only a small segment of the population in Redmond is vulnerable to the hazard.

Hazard Profile – Hazards were assessed as to location, severity, warning time (where relevant), and the probability of occurrence.

A hazard rating was offered that considered each variable in the assessment and was based on a limited objective appraisal using information provided by relevant sources, observations, and trends.

HIGH: There is great likelihood (probability) that a hazardous event (severity, location, and warning) will occur within the next 25 years.

MEDIUM: There is moderate likelihood that a hazardous event will occur within the next 25 years.

LOW: There is little likelihood that a hazardous event will occur within the next 25 years.

Vulnerability – An adjective description (High, Medium, or Low) of the potential impact a hazard could have on Redmond. It is the ratio of population, property, commerce, infrastructure, and services at risk relative to the entire City. Vulnerability is an estimate generally based on a hazard's characteristics. A High rating would indicate a significant impact throughout the entire City, a Medium rating would indicate an isolated significant impact or a moderate impact throughout the entire City, and a Low rating would indicate an isolated moderate impact in a selected area or a limited impact throughout the City.

Capability – Refers to the tools available to reduce the risk. An example is the ability to fight fire and avert a disaster.

Primary and Secondary Hazards – Hazards are identified as being either primary or secondary. A primary hazard is the initial hazard responsible for the potential danger to life or property. Most often the primary hazard triggers a wide range of secondary hazards. Secondary hazards are attributable to a primary hazard; thus we view a landslide as most often a secondary hazard to earthquakes or flooding. Similarly, think of unsecured furniture as a secondary hazard to earthquakes.

THE CITY OF REDMOND - PROFILE

Redmond is the sixteenth largest city in the State of Washington, with a residential population of 45,256. It encompasses an area of over 16.6 square miles and is located less than 20 miles east of downtown Seattle. Redmond sits at the north end of Lake Sammamish and covers the surrounding hills. Tall evergreen forests and salmon spawning streams are natural to the area. Logging and agriculture provided the early economic base of the area. Now numerous business parks are home to the area's manufacturers and high-tech businesses.

Redmond enjoys a diverse and growing economic base. In fact, Redmond's 52,812 employees outnumber the City population of 45,256. The community is home to some of the major high-tech firms in the country, including Microsoft, Nintendo of America, Honeywell, and Primex Aerospace Company. Redmond is also the headquarters of such businesses as Eddie Bauer and Genie Industries and the regional headquarters of Safeco Insurance. Seven of the top 16 biomedical companies in the Puget Sound region call Redmond home – topped by Spacelabs Medical and Medtronic Physio-Control Corporation. Physio has gained national prominence with the growing use of defibrillators to treat heart attack victims.

A strong retail sector is enhanced by Redmond Town Center, a 1.4 million square-foot mixed-use development that includes retail stores, restaurants, and commercial offices. From an original incorporated area of three-square blocks, the City has expanded to its present size of over 16.6 square miles. Regional growth around the Eastside will continue to impact Redmond as more people and businesses are attracted to the area.

The elevation at city center is 50 feet. The annual mean temperature is 52.8 degrees, and the average annual precipitation is 35.50 inches. In 1960, the population of Redmond was 1,426. As of April 2001, the population of Redmond was recorded at 45,256.

From 1996 to 1999, 240 acres of wildlife habitat have been converted to development. Recently, the City has undertaken restoration work along the Sammamish River, Peters Creek, and Bear Creek. A U.S. Fish and Wildlife survey conducted in September 1998 showed that both Chinook and Sockeye were found in the City's first Sammamish River restoration site.

The City has established a transfer of development rights program designed to protect open space, agricultural land, and wildlife habitat in the City. The City is developing a Wildlife Habitat Plan that will provide the framework for an overall strategy for wildlife habitat management in Redmond, and has established regulations to preserve trees.

DROUGHT

I. Hazard Profile

Drought is a normal, recurrent feature of climate, although many erroneously consider it a rare and random event. It occurs in virtually all climatic zones, although its characteristics vary significantly from one region to another.

Drought originates from a deficiency of precipitation over an extended period of time, usually a season or more. This deficiency results in a water shortage for some activity, group, or environmental sector. Drought should be considered relative to some long-term balance,

timing, and effectiveness between precipitation and evapo-transpiration. Other climatic factors such as high temperature, high wind, and low relative humidity are often associated with it in many regions of the world and can significantly aggravate its severity.

Drought should not be viewed as merely a physical phenomenon or natural event. Its impacts on society result from the interplay between a natural event (less precipitation than expected resulting from natural climatic variability) and the demand people place on water supply. Human beings often exacerbate the impact of drought.

Source: "Understanding and Defining Drought," First published: November 15, 1995 by the National Drought Mitigation Center, http://enso.unl.edu/ndmc/enigma/def2.htm

Secondary hazards that could result from drought may include:

- Fire
- Landslides (defoliation followed by rains)
- Economic Impact

A. Location

The Redmond residential and business communities are vulnerable to drought or any loss of water.

http://www.wrh.noaa.gov/afos/SEA/ESF/SEAESFSEA

The Drought Monitor of the National Drought Mitigation Center maps the extent and degree of drought conditions for the United States. There is no single index of drought; therefore, "the Drought Monitor [is] a synthesis of multiple indices, outlooks, and news accounts that represents a consensus of federal and academic scientists." Drought maps are available at http://enso.unl.edu/monitor/monitor.html

B. Severity

"Drought conditions have differing impacts on the community during different times of the year. A drought during the winter, which limits snow pack, might have a more severe impact on the community than one in the late summer when reservoirs can be used to mitigate problems. There are also certain times during a growing season when crops are better able to cope with drought conditions than others; therefore, crop yields can vary greatly depending on when in the growing season the drought occurs." (KCOEM)

C. Probability

Since 1900, about fifteen droughts of various duration have affected the Puget Sound Region. The King County Office of Emergency Management lists the most significant droughts affecting the Puget Sound region in the past thirty-five years as:

1965-1966: The entire state was affected by drought conditions. King County recorded Palmer Indexes of roughly -1.5 from June 1965 to December 1966.

June-August 1967: No rain fell from the third week in June to the third week in September. 1,767 fires burned throughout the state.

October 1976-September 1977: King County experienced precipitation levels 57 percent of normal. Stream flows averaged between 30 and 70 percent of normal. Temperatures were higher than normal, which resulted in algae (sic) growth and fish kills.

October 1991-September 1994: Stream flows were between 30 and 60 percent of normal. Agriculture products suffered greatly. Thirty counties were designated as Emergency Drought Impact areas.

The governor declared the most recent drought in March of 2001.

The possibility of drought affecting Redmond is moderate when the history of drought in the region is considered overt the past one hundred years.

D. Warning

The State of Washington codifies an operational definition of drought. The State of Washington Department of Ecology is responsible for issuing drought emergency recommendations to the governor. Under Washington state law (Chapter 43.83B RCW - Water Supply Facilities), two criteria must be met in order to declare a drought. First, the water supply must be less than 75 percent of normal. Second, the shortage must create undue hardship for some users.

"On March 14, 2001, under recommendation from the Department of Ecology and the Executive Water Emergency Committee, Governor Gary Locke declared drought status in Washington State."

From "Drought Declared In Washington" Drought homepage, Washington State Department of Ecology, Water Resources Program
http://www.ecy.wa.gov/programs/wr/drought/droughthome.html

II. Vulnerability and Impacts

A. Natural

Reduced stream flows impact aquatic life. An effect of wildfire, a secondary hazard, is the siltation of waterways from the increased rate of water run-off over the landscape after a fire. Salmon and trout are especially sensitive to reduced flows, siltation, and associated increases in water temperature.

B. Manmade

Lawns and gardens and irrigated landscapes (golf courses) are vulnerable to drought conditions.

C. Systems

In a drought, the reduction of the amount of available water in reservoirs intensifies the debate over water allocation among agricultural irrigators, municipal water authorities, environmental agencies, industrial users, and tribal nations. The debate is further complicated in an energy crisis, as much of the region's power derives from hydroelectric power plants.

III. Risk Rating

Redmond faces a moderate risk of a drought in that there is a moderate probability of occurrence, and the entire region is vulnerable to this. The risk is shifting as the demand for water regionally approaches the demand. Further, the system is exposed to other hazards that can impact the water system during a drought.

IV. Capability

Redmond has an emergency plan for dealing with water shortage. One of the tenets is the voluntary reduction of water usage in order to avoid mandatory water rationing. Since droughts have a long onset, the policy starts early. This has been effective in the past. Further, Redmond's wells have a different cycle than the regional reservoirs. When managed as a reserve, they add to Redmond's capability; however, the regional demand is moving toward the regional capacity. If this trend continues, capability will be readily stressed.

V. Links

Social Aspects of Weather: Summer/Winter. National Center for Atmospheric Research Environmental and Societal Impacts Group
http://www.esig.ucar.edu/socasp/summer-winter.html

King County Office of Emergency Management, "Natural Hazards: Droughts"
http://www.metrokc.gov/prepare/hiva/drought.htm

City of Seattle, Seattle Public Utilities, "Current Water Supply Conditions and Outlook"
http://www.cityofseattle.net/util/watersupply/current.htm

http://www.ci.redmond.wa.us/insidecityhall/publicworks/environment/conservation.asp

EARTHQUAKES

I. Hazard Profile

The Earth is formed of several layers that have very different physical and chemical properties. The outer layer, about 70 kilometers in thickness on average, consists of about a dozen large, irregularly shaped plates that slide over, under, and past each other, on top of a partly molten inner layer. Within these plates are three types of boundaries: spreading zones, transform faults, and subduction zones.

An earthquake is the vibration, sometimes violent, of the Earth's surface following a release of energy in the Earth's crust. The energy can be generated by stress on the Earth's plates, by volcanic eruptions, and the plates buttressing up against one another generating friction. Dislocations of the Earth's crust cause the most destructive and catastrophic quakes. The crust comes apart at the seams. When this happens, the crust might bend or move parallel to each other and, when the stress exceeds the strength of the rocks, break and "snap" to a new position causing the ground to shift. This movement in turn dislocates, ruptures, or damages objects that sit atop the Earth's crust.

There are three types of earthquakes that the Puget Sound region could experience along these faults:

Deep Earthquakes

Deep earthquakes occur within the Juan De Fuca Plate as it sinks into the mantle. They are at depths of 25-100 km. The largest of these recorded were the magnitude (M) 7.1 Olympia earthquake in 1949 and the M6.5 Seattle-Tacoma earthquake in 1965. Due to their depth, aftershocks are not usually felt. There have been six deep earthquakes in the Puget Sound basin with measured or estimated magnitudes of 6.0 or larger. The most recent deep earthquake was felt in Redmond on February 28, 2001. Its epicenter was beneath the Nisqually Delta near Olympia, Washington and measured 6.8 on the Richter scale.

Shallow Earthquakes

Shallow earthquakes occur within the North American Plate itself, within 30 km of the surface, and are thought to originate from stress transmitted from the Cascadia Subduction Zone into the interior of the North America Plate. Several recent moderate examples occurred throughout Washington and most parts of Oregon, measuring between M5.0-6.0: in 1995, 1993, 1990, 1962, 1945, and on the Mt. St. Helens seismic zone in 1981. Larger quakes of magnitudes 5.9 and 6.0 occurred near Klamath Falls, Oregon.

The Seattle Fault that runs east-west through Seattle and Issaquah and terminates near Preston. The Southern terminus of the South Whidbey Fault is near Woodinville. Each of these faults is capable of producing a 7+M, shallow earthquake in close proximity to Redmond.

Subduction Zone Earthquakes

Subduction zone earthquakes occur along the interface between tectonic plates, most tending to be deep below the earth's crust where the denser plate of earth slides under the less thick or dense plate.

Compelling evidence for great-magnitude earthquakes along the Cascadia Subduction Zone has recently been discovered. These earthquakes can be enormous (M8-9+) and reoccur approximately every 550 years on average. As two thick plates crash into each other, they form broken-faulted mountains. The recurrence interval, however, has apparently been irregular – as short as about 100 years and as long as 1,100 years. The last of these great earthquakes struck Washington about 300 years ago.

Secondary hazards may include:

- Liquefaction and subsidence of soils
- Landslides impacting transportation, homes, and public infrastructure
- Seiche or sloshing water impacting shoreline developments
- Fires

The severity of soil-related natural hazards and ground failure phenomena often depends on status of groundwater, rainy seasons, and drought conditions.

For more information about earthquakes:
http://www.geophys.washington.edu/SEIS/PNSN/INFO_GENERAL/NQT/what_causes.html

A. Location

The Seattle Fault, the South Whidbey Fault, and the Cascadia subduction zone are the most likely major problems for Seattle. The soils in the Sammamish Slough and Bear Creek drainages are glacial fill and will liquefy. Redmond is largely developed in these valleys. This includes the City Campus.

In a regional event, Redmond is vulnerable to the loss of electricity, water, and transportation.

B. Severity

The two most damaging earthquakes in Washington State happened in 1965 – a magnitude 6.5 quake located between Seattle and Tacoma and a magnitude 7.1 in Olympia. Both quakes caused significant damage throughout the region.

The recent February 28, 2001 Nisqually earthquake measured a magnitude 6.8, a Benioff earthquake originating thirty miles below the surface, near Olympia, Washington. Because of the depth of the earthquake, it was far less destructive than it could have been if nearer to the surface.

The Cascadia, South Whidbey, and Seattle fault events will cause liquefaction of the soils in Redmond. These events will also create regional lifeline problems. Lifeline issues will impact the Redmond economy and recovery.

C. Probability and History

Worldwide there are 18 magnitude 7 to 7.9 earthquakes per year, but these are concentrated in a few narrow regions of the world. Although there is no sure way to predict an earthquake, there is a regular pattern of occurrence in the Puget Sound region.

Since 1980, the Pacific Northwest has had an average of more than 2,000 earthquakes (per what?). The vast majority are shallow earthquakes (>98%) with a magnitude of less than 3.0 (>99%). Geologic evidence indicates that the Cascadia Subduction Zone has generated great earthquakes at roughly 500-year intervals, most recently about 300 years ago. Further, major events on the Seattle and Whidbey faults appear to occur at a rate of between 700 and 1,500 years. The cumulative probability of a major event that would impact Redmond may be 20-60% in 100 years. This assumes that subduction is occurring at the historic rate.

II. Vulnerability

Redmond's 45,256 residents are vulnerable to an earthquake in various degrees depending on the location of the individual at the time of the event. Possibly the most detrimental damage to Redmond would come from a potential quake along the Seattle fault line. A Cascadia Region subduction zone quake could result in a minimal amount of damage to the City depending on the magnitude.

The City's central business district is built upon soft soils that could liquefy during seismic activity. Manmade structures are vulnerable depending on soils, when they were built relative to uniform building codes, and if made from un-reinforced masonry. Public infrastructure, such as the Olympic Pipe Line, water distribution line, bridges, streets, and possibly the infrastructure in Old Redmond Town Center, are vulnerable to ground failure and liquefaction impacts, depending on the magnitude and type of quake hitting the region.

Although the 2001 Nisqually earthquake could be felt as far south as Oregon and as far north as Vancouver B.C., Redmond did not suffer extensive damage but did experience minor liquefaction.

Potential manmade hazards related to an earthquake event include:

- People stranded if transportation or other lifeline networks fail. Redmond may be unsupported if the disaster is region-wide.
- Chimneys, bricks, trees, displacement of homes, bridges, and un-reinforced structures.
- Elevated concrete or brick walkways.
- Cracks in roads could cause accidents.

Finally, potential system vulnerabilities include:

- Business interruption and resulting losses in sales, wages, and profits from businesses.
- Redmond's local economy would be impacted if economic processes break down, but more likely are potential worldwide business impacts since the City is headquarters to many multinational corporations.

III. Risk Rating

The earthquake risk rating is high. The combination of the high vulnerability of the infrastructure, critical facilities, the economy, and the close proximity of highly volatile faults justify this rating.

IV. Links

For further information on earthquakes please refer to the following links:

http://www.crew.org
http://www.usgs.gov
http://earthquake.usgs.gov/activity/latest/eq_01_02_28.html
http://maximus.ce.washington.edu/~nisqually/
http://beagle.ceri.memphis.edu/public/eqinfo.shtml
http://www.geophys.washington.edu/SEIS/PNSN/INFO_GENERAL/NQT/what_causes.html

EPIDEMICS

I. Hazard Profile

An epidemic is the outbreak of disease beyond its endemic rate. One of the most common causes of epidemic is the influenza virus. The earliest worldwide outbreak of influenza in recent times occurred in 1918-1919, when an estimated 20 million people died – more than 500,000 in the United States alone. The "Asian Influenza" of 1957 swept over the world quickly and resulted in 750,000 fatalities in America. In 1968, the "Hong Kong Influenza" generated an even higher number of fatalities. Every spring, the World Health Organization makes predictions for the flu strains most likely to strike in the coming flu season, generally November through April. Even with this kind of advance warning, influenza epidemics have the potential to pose serious risk. Influenza is one of the oldest and most fatal diseases known to mankind. Epidemiologists expect outbreaks from new viruses like SARS to become more common in the future.

There are other types and sources of epidemics as well. Biological weapons are another potential source of epidemic. The most likely biological weapons include Anthrax, smallpox, tularemia, viral hemorrhagic fever, and toxin. The estimated mortality for a population of 500,000 in the face of 50 kg of a biologic toxin in aerosol form is as follows: Anthrax, 95,000 dead; Tularemia, 35,000 dead; Typhus, 19,000 dead. Obviously, the severity of a potential epidemic as a result of biological warfare would be great.

Food-borne illness also poses a risk of epidemic. The frequency of serious gastrointestinal illness is 34 percent above what it was in 1948, according to the Centers for Disease Control and Prevention. Every year the agency says 5,000 deaths, 325,000 hospitalizations, and 76 million illnesses are caused by food poisoning, with questions regarding the safety of imported, contaminated products. Public water systems also have the potential to be sources for epidemic disease.

In May of 2000, five people were killed and hundreds were sickened with an intestinal bacteria found in the local water supply. According to the Canadian Health Ministry, the greater Vancouver water supply is responsible for about 17,500 gastrointestinal illnesses each year, including three deaths apparently due to too few filtration systems. Public water sources are always vulnerable to resistant strains of parasites and bacteria.

According to the King County Health Services Communicable Disease Center, there is also the potential for an epidemic from sexually transmitted diseases in King County. Johns Hopkins University reports that gonorrhea is the most commonly reported infectious disease in adults, with more than 875,817 cases reported between 1992-1994. In Sub-Saharan Africa, 26 million people have AIDS. In 2000, more than 2.4 million people died from AIDS in the region.

The hoof and mouth epidemic that is ravaging Great Britain's livestock industry has US cattle producers worried. Experts predict that it is only a matter of time before the disease makes its way into this country on the sole of a traveler's shoe or a stray bit of imported food stuff. With nearly 2,000 confirmed cases of the disease reported, the epidemic has already cost British companies $30 billion.

Clearly, every community is exposed to the risk of epidemics at some level. The questions are: what is the severity of the risk, what areas are vulnerable, and what is the probability of the hazard of an epidemic?

Secondary hazards that could result from epidemics may include

- Economic impacts.
- Reduced response.

A. Location

Various locations in the City of Redmond would be exposed to the hazards of an epidemic, depending on the type of epidemic. Retirement homes, hospitals, and daycare centers are locations where the more vulnerable members of a community are often brought together. Those members of the community who have compromised immune systems, the elderly, and very young children, are especially vulnerable to epidemics such as influenza.

All of Redmond would be vulnerable to a biological weapons epidemic. More densely populated areas, such as an apartment complex, mall, school, or large office building, would be more likely to be targeted.

Hoof and mouth disease or other animal-borne epidemics would be located in agricultural areas. Although Redmond does possess large tracts of agricultural land, the Redmond Department of Business Licenses reports that there are no licensed livestock businesses operating in Redmond.

B. Severity

The severity of an epidemic would depend on the disease itself. There are influenza events affecting a large percentage of the population every year during the flu season, but if it is a mild strain, the severity of the epidemic is greatly lessened. If a particularly virulent influenza virus occurred, there is a great potential for an epidemic of high severity.

A biological weapons attack has the potential to be of enormous severity to the population of Redmond. An outbreak of food poisoning could also be severe, although the effects of the severity would be localized among those who ingested the contaminated food or liquid. An epidemic from such sexually transmitted diseases as gonorrhea would be far less severe than an epidemic of the AIDS virus.

C. Probability and History

There is no history of serious epidemic disease in Redmond in recent times. Nonetheless, the King County Health Services Communicable Disease Center warns that in the presence of a growing population, there is more opportunity for infectious disease to occur and spread. In the last ten years, the population of Redmond has increased 26.4%. As such, there is reason to believe that the probability of an epidemic in Redmond is proportional to the increase in population. The probability of epidemic from a mild form of influenza virus is high, while the probability of a severe form of the influenza virus is low.

The worldwide occurrence of epidemics as a result of biologic warfare is very low, and as such, a low probability rating is assigned to the hazard of epidemic from biological weapons.

While strict Health Department regulations on sanitary food handling and preparation offer some protection from the risk of disease from contaminated food, the risk nonetheless increases as

the number of opportunities increases. As such, the risk of a food-borne epidemic is moderate. The risk of public water supply contamination is also moderate.

The probability of a sexually transmitted disease (STD) epidemic from a source such as gonorrhea is moderate to low, given the presence of STDs in the general population. The probability of a sexually transmitted and blood-borne epidemic such as AIDS is low because of the relative percent of infection in the general population in the geographic region of Redmond. Nonetheless, King County health officials are planning to issue a public warning that the AIDS virus infections may be increasing at an alarming rate among gay men.

Dr. Bob Wood, AIDS Control Officer for Public Health in Seattle and King County, told a state advisory committee on the disease that it appears a "new wave" of infections is hitting the area. The increases, he said, are a result of people relaxing cautions about sexual practices that spread the virus. Worries have subsided because new drugs extend the lives of AIDS patients, and people are burned out on the "safe sex" message, he said.

D. Warning

An influenza epidemic could have some warning in that most people would know to expect the presence of the flu virus from November to April. That, coupled with the WHO predictions every spring, serves as warning for most types of potential flu epidemics.

A food- or water-borne epidemic would have no warning, although it would likely be only a short period of time before the cause of the epidemic was identified and resolved. A sexually transmitted disease epidemic would have considerable warning, and most susceptible segments of the population could take precautions against infection. An animal-related epidemic, such as hoof and mouth disease, might have ample warning but still be vulnerable due to the nature of the disease.

II. Vulnerability

A. Natural

There would be little threat to the natural environment as a result of an influenza epidemic, food-borne, or sexually transmitted epidemic. The natural environment would be assigned a low impact/low vulnerability rating for these types of epidemics. It is possible that the natural environment, particularly fish and wildlife, would suffer catastrophically in the event of a biological weapons epidemic. For this reason, the natural environment would be assigned a high impact, high vulnerability rating.

B. Manmade

The manmade environment, such as homes, businesses, and other essential infrastructure, is not vulnerable in the event of an epidemic. Therefore, the manmade environment is assigned a low impact, low vulnerability rating for an epidemic.

C. Systems

In the event of a catastrophic epidemic (such as biological warfare or a deadly strain of influenza), community systems would be severely strained as hospitals and morgues filled up with the victims of the epidemic. Police and emergency caregivers would be heavily impacted.

The long-term costs related to health care and the potential need for child placement (as in AIDS-ridden Africa) could be astronomical. There would also be significant impact due to the loss of productivity and the disruption of services caused by a high impact epidemic. In the event of severe and widespread epidemic, there would be a high impact/high vulnerability rating.

For other forms of epidemic, a low impact, low vulnerability rating would be assigned to community systems.

III. Risk Rating

An epidemic can be given a high, moderate, or low risk rating depending on the type of epidemic. In general, a severe epidemic would have a high impact but low probability and, as such, would have a low risk rating. An epidemic such as a low severity strain of the influenza virus would have a moderate probability and low impact and, as such, a low risk rating. An epidemic caused by mass food contamination or sexually transmitted diseases would have a moderate severity rating, a low probability, and thus a low risk rating.

IV. Links

http://www.hopkins-id.edu
http://www.seattletimes.nwsource.com.news
http://www.fkmedical.com/fk2.html
http://www.upwardquest.com/plague.html
http://www.discovery.com/exp/epidemic/epidemic.html
http://www.unaids.org/epidemic_update/repo
http://www.who.int/emc/diseases
http://www.pbs.org/wgbh/pages/amex/influenza

Flooding

I. Hazard Profile

Floods have caused a greater loss of life and property and have disrupted more families and communities in the United States than all other natural hazards combined. Redmond contains four principle bodies of water: the Sammamish River, Bear Creek, Evans Creek, and Lake Sammamish.

In 1963, the Army Corp of Engineers, in coordination with King County, re-engineered the Sammamish River that historically had left its banks, causing moderate flooding in downtown Redmond. Since that time, the Sammamish River itself has not flooded. Any flooding events related to the Sammamish River are the result of backwater flooding, when surface water discharge spills onto City streets and nearby development due to peak river conditions and reduced river capacity.

The Bear Creek basin has a history of flooding. Development regulations predicated on FEMA floodplain determinations and a local designation of a zero-rise floodplain along Bear Creek in the area upstream of Redmond Way to the City limits, including the area of Evans Creek, have helped to curtail vulnerable construction practices. Further regulations relating to fill practices within the designated Urban Conservancy area along Bear Creek and the Sammamish River

have also helped to protect the storage capacity of the floodplain. Any development activity in the floodplain of the Bear Creek and Sammamish River Urban Conservancy area is required to provide storage for each yard of cubic fill added to the floodplain. In other words, for each yard of fill added to the floodplain in the Urban Conservancy area in Redmond, a cubic yard must be removed in some other area of the floodplain in order to compensate for the reduced storage capacity associated with the development activity.

The Bear Creek Basin plan has also contributed to the stability of Bear Creek and Evans Creek. The overall plan addresses flooding, erosion, and habitat protection by recommending 65% forest retention in the Bear Creek Basin. Redmond adopted this recommendation as a planning regulation for the Bear Creek Basin. By retaining forested cover, the hydrologic absorptive capacity of the riparian areas in the Bear Creek Basin is preserved, thus reducing the risk of flashy water flow conditions that could otherwise lead to scour, downstream gravel recruitment, erosion, and sedimentation.

Federal disaster aid was made available in King and Snohomish counties in 1997 to help communities in Washington State recover from winter storms. Flooding, mud, and debris caused the damage. We can expect continued flooding because human activities increase impervious surfaces. Paving roads and parking lots reduces water filtration into aquifer recharge areas and increases runoff into streams and lakes. In the past 20 years, the population in Redmond has increased approximately 254%, and the number of businesses has increased by approximately 708%. It is projected that by the year 2012, Redmond's population will increase by 16,563 more residents, 9,878 more houses and 29,500 more jobs. All of these factors contribute to an increase in impervious area and, therefore, an increase in the potential for flooding in Redmond.

Secondary hazards that could result from flooding may include

- Land slides
- Hazardous waste contamination
- Economic disruption

A. Location

The area most commonly affected by flooding events is along Bear Creek, north of Redmond Way and south of Union Hill Road. Flood flows along Bear Creek have increased as development along Bear Creek increases, again, as a result of increased impervious surfaces. Before the early 1990's, the area between Bear Creek and Union Hill Road frequently flooded. A public works project known as the "Stewart Fill" remedied most of this situation; however, flooding along Bear Creek continues to be a problem.

Most of downtown Redmond that lies within the 100-year flood plain of the Sammamish River has been built under regulations set forth by the Federal Emergency Management Agency (FEMA) based on the Flood Insurance Rate Maps (FIRM) that were created by the Army Corp of Engineers. Elevation reference marks are found on all flood maps. These marks identify points where a ground elevation is established by survey. In order to build in an identified flood plain, developers must raise the grade of the finished floor one foot above the flood plain elevation.

In the case of Redmond, the elevation of the 100-year flood plain is approximately 12 inches higher in elevation than those areas outside of the flood plain. Few locations along the

Sammamish River are vulnerable to flooding, except in the instances of backwater flooding. The area most commonly affected by backwater flooding is beneath the railroad tracks along Redmond Way. This area flooded during the heavy snows and subsequent melt-off related to the winter storm of 1997. At that time, four lanes of Redmond Way were closed, and traffic through the area was diverted to other streets.

Other locations of potential flooding are the low-lying basins close to Lake Sammamish. These areas are susceptible to backwater flooding.

B. Severity

The severity of flooding in Redmond needs to be assessed on a system-by-system basis. The backwater flooding along the Sammamish River system is only problematic in times of heavy rain. The river itself does not leave its bank. The problem of localized flooding along Redmond Way beneath the railroad tracks is not so severe as to warrant any public works projects aimed at correcting the drainage in the area. When Redmond Way is flooded in this area, traffic is simply diverted. As such, flooding events associated with the Sammamish River are given a low severity rating.

The flooding events along Bear Creek are also given a low severity rating, even though Bear Creek often floods. This low severity rating is based on the development regulations that Redmond has established for a zero-rise flood plain overlay for Bear Creek, in addition to the one-foot rise floodway established by FEMA. While FEMA's flood elevation is based on current flow analysis, the zero-rise flood plain requires that all new development applications submit an analysis of the zero-rise elevation for the project.

This zero-rise elevation must be based on a future flow analysis using the Redmond Comprehensive Plan designation for the entire Bear Creek basin. Thus, the required zero-rise elevation is based on where the flood plain will be when the area is built-out per comprehensive designation. This projected elevation will be relative to the amount of impervious surface that will be associated with a fully developed area and reflect an elevation that will more accurately anticipate the building elevation necessary to insure protection against future flooding events. As such, the severity of flooding in the Bear Creek flood plain is greatly mitigated by comprehensive public works and land use regulatory mechanisms.

It should be noted that both public and private development activity in the Bear Creek Urban Conservancy is subject to the zero-rise flood plain regulations. This means that public streets and bridges are also being built to standards that will anticipate potential future flooding conditions. In that the Bear Creek Urban Conservancy area is expected to experience intense development pressure as Redmond itself grows, it is especially important that the associated effects of increased impervious surfaces be factored into the flood plain management plan for the area.

The severity of flooding related to Lake Sammamish is given a low rating. It requires a very high-volume flooding event to raise the water level in Lake Sammamish. As such, flooding events are minor and infrequent.

C. Probability

Redmond has recently experienced a number of flooding events and associated hazards, such as slides, sink holes, and road closures. During the January storm of 1997, twenty-nine roads

in King County remained closed due to slides, floods, and sinkholes. Included in this count were sections of Sahalee Way Northeast and Southeast Duthie Hill Road on the Sammamish Plateau in Redmond.

The January 1997 storm also shut down five streets because of flooding. A hazard associated with that storm was a 200-foot-long mudslide that forced the evacuation of 35 residents along 180th Avenue Northeast. The slide cut off the only road to seven houses in the area and prompted the evacuation of nearby condominiums.

In February of 1996, Patterson Creek east of Redmond cut a new path, spilling over its shallow banks and roaring across the Redmond-Fall City Road.

In November of 1998, East Lake Sammamish Parkway Northeast, south of Redmond, remained closed after rainfall and a broken water main caused part of the road to drop into a 25-foot sinkhole on Friday. King County transportation crews worked through the night to stabilize the road so it could be repaired.

While there is a history of flooding and other hazards associated with severe precipitation, these events are not anticipated on an annual basis. Indeed, they are due to exceptional weather conditions (except in the case of Bear Creek, where annual flooding is anticipated). As such, the probability of flooding in Redmond can be assigned the following values: a low probability of flooding on the Sammamish River, a high probability of flooding for Bear Creek, and a low probability of flooding for Lake Sammamish.

D. Warning

All flooding events would have a considerable amount of warning, in that it requires a severe weather event and substantial rain and/or snowfall to produce a flood condition that would not otherwise be anticipated by flood plain management strategies. Because the Sammamish River, Bear Creek, and Evans Creek flow north out of Lake Sammamish and because Lake Sammamish is a high-volume body of water, there are no true flash flood events in Redmond.

Flooding and the secondary hazards associated with flooding, such as landslides and sinkholes, are thus not compounded by a complete lack of warning. Mitigation in the form of comprehensive development regulations that establish zero-rise building elevations – based on future flow analysis and careful flood plain management strategies – have helped to assuage the hazards associated with high intensity flooding events by, in essence, extending the warning period.

II. Vulnerability

A. Natural

The most important threat to the natural environment related to a flooding event is the potential for damage to fish habitat – in particular, the salmon habitat. In Bear Creek, a major flood event, such as a 25- to 50-year flood, can result in channel altering events and ensuing morphological changes to riparian vegetation. While flooding events are a part of the natural regime in streambeds, increased development pressures, in particular, the added runoff associated with increased impervious surfaces, have compounded the occurrence of flooding in Bear Creek. A major flood can result in stream scour, with devastating impact on that year's fish run due to destruction of salmon eggs laid in the preceding fall. Short-term damage to

system stability include bank erosion, sedimentation, and downstream gravel recruitment. The potential of a major flood event is relatively high on Bear Creek, and the impacts of such a flood are high. As such, the risk to the natural systems of Bear Creek is given a high risk rating. Flooding events on the Sammamish River are given a low potential and low impact rating and are thus given a low risk to natural systems rating.

B. Manmade

The manmade environment is susceptible to flooding in terms of damage to structures caused by rising water levels and potential secondary hazards such as landslides. In that the vast majority of development in Redmond is either outside of the flood plain or built at an elevation that precludes the threat of damage, a low impact, low vulnerability rating is assigned to the manmade environment.

C. Systems

The most serious threat to the community systems is from obstructed or damaged access routes. The recent history of flooding events in Redmond reveals that blocked roadways were the most common problem associated with the flooding. These particular roadways are site-specific in terms of their vulnerability (i.e., at the base of an unstable slope or in a historic basis, such as Redmond Way beneath the railroad tracts). As such, community systems are given a moderate impact, moderate vulnerability rating.

III. Risk Rating

There is a high probability of low impact flooding along Bear Creek and Evans Creek, and thus a low risk rating. There is low probability of low impact flooding along the Sammamish River, and thus a low risk rating is assigned. There is a low probability of low impact flooding along the shores of Lake Sammamish, and thus a low risk rating is assigned for flooding in this area.

IV. Links

http://www.splash.metrokc.gov
http://www.floods.org/
http://www.ametsoc.org/ams
http://www.colorado.edu/hazards
http://www.usace.army.mil/
http://www.fws.gov/
http://www.weather.com/
http://www.usgs.gov/
http://www.fema.gov/
http://www.splash.metrokc.gov

HAZARDOUS MATERIALS

I. Hazard Profile

A hazardous substance is anything that may cause damage to persons, property, or the environment when hazardous substances are released into soil, water, or air. In the Puget Sound region, chemicals are manufactured, shipped, imported, and transported in increasing quantities throughout the region. As many as 700,000 products pose physical or health hazards that can be defined as hazardous chemicals. Each year, over 1,000 new synthetic chemicals are introduced. Hazardous substances are categorized as toxic, corrosive, flammable, irritant, or explosive. Hazardous material incidents generally affect an area that houses chemical manufacturers, distributors, and importers.

Toxic chemicals often produce injuries to communities, people, environments, and almost any part of the body they come in contact with, typically the skin and the mucous membranes of the eyes, nose, mouth, or respiratory tract. For example, "irritant gases, such as chlorine and ammonia, can produce a localized toxic effect in the respiratory tract; corrosive acids and bases can produce a local damage to the skin." Furthermore, hazardous chemicals released into the environment can penetrate water, food, and human processes. It is important to recognize that exposure to chemical compounds that are categorized as hazardous have the potential to develop adverse effects when exposed to vulnerable populations and environments.

Secondary Hazards: It is difficult to point out specific secondary impacts to hazardous materials fallout. Secondary effects to hazardous materials would depend strictly upon how the initial incident was handled. Secondary effects to hazardous materials would vary depending on various issues and procedures taken to solve the spill or leak. Secondary impacts to hazardous material could happen if there were instances of cross contamination, exposure without proper equipment, and contact with natural and manmade environments of any kind between dangerous chemicals. Secondary effects would also depend on the type of exposure and degree of exposure to the chemical(s) in question during the event.

A. Location

The City of Redmond could experience hazardous chemical fallout of some kind due to the presence of 256 facilities registered with the EPA. The potential for a hazardous materials incident exists within and nearby these facilities dependent upon the kinds of hazard materials handled at the facilities. While chemical incidents are infrequent, chemical incidents are capable of endangering the health of communities, individuals, first responders, and the environment of Redmond.

For a map and list of registered Hazardous Material facilities in Redmond, refer to the following: http://www.epa.gov/epahome/comm.htm and enter in the zip code.

B. Probability

The overall probability for exposure in Redmond to a hazardous material is relatively low. Redmond in not located on a major transportation corridor and only a single packinghouse stores a significant quantity of a hazardous chemical. Those working within the plant appear to be familiar with the handling of the ammonia stored on site. People most likely to encounter hazardous material exposure are emergency personnel that respond to emergency calls without being forewarned that hazardous materials may be involved.

C. Severity

The severity of toxic exposure depends on the kind and amount of toxins released. The route by which personnel are exposed to a compound also plays a role in determining the severity of the compound taken up by the body. A compound may be absorbed following exposure by one route more readily than by another. With that, the severity also depends on the duration of exposure to the compound and the concentration of the compound to which one is exposed. The relationship between the total amount of the compound absorbed by the body (dose) and the concentration of that compound in the environment will help determine the type of medical and emergency assistance to administer on the scene.

There is a low, medium, and high range that can be associated to the severity that again is dependent on the type of chemical, the amount, location, and infected environments. While transportation incidents attract larger media attention, statistics show that almost 75% of all acute hazardous material events, excluding fuel spills, occur in the fixed locations where they are used or stored. Hazardous material incidents can range anywhere from small releases at a factory site to rapidly expanding events that can endanger communities and environments.

II. Vulnerability

A. Natural

People, pets, livestock, and vegetation in close proximity to facilities producing, storing, or transporting hazardous substances are at higher risk. Populations further downstream, downwind, and in the periphery of released substances are particularly vulnerable depending on the substance and Emergency Management's attempts to contain the hazardous material leakage.

All ecological systems could be impacted to certain degrees depending on the volatiles. The natural environment can be vulnerable to a hazardous material incident depending on the location of the incident, the type of chemical, and its proximity to the natural environment. Redmond has various parks, natural forests, and Lake Sammamish that could all be impacted by a chemical toxin if released into the general environment.

B. Manmade

Manmade facilities, homes, and infrastructure are also vulnerable to a hazardous material incident depending on the location, type, and amount of toxins released and stored in manmade facilities. The system that carries and stores water could be impacted if specific toxins were deposited into drinking water.

C. Systems

A hazardous materials accident can occur almost anywhere in Redmond depending on the processes, for example: storage, shipping, development, etc., associated to the hazardous materials. In a severe event, there is potential for closure of public buildings, widespread business interruption, and economic losses while cleanup is completed. At least two of the wells have potential exposure to hazardous materials spills.

III. Risk Rating

The hazardous material incident can be given a high, medium, or low risk rating depending on the incident. This risk warrant could receive an overall medium risk rating, because there are facilities in Redmond that deal with hazardous materials on a daily basis. However, because the storage facility is easily accessible by response personnel, we have downgraded the rating to a low to moderate designation.

A "High" risk rating can be associated to hazardous materials housed in a factory or chemical storage facility when it exploded, leaked, or was broken into and chemicals were disrupted. This would endanger the surrounding community, environment, and systems. If outside resources had to be called in to help administer recovery, this could potentially be acknowledged as a high-risk incident.

A Medium risk incident might be a hazardous material incident if chemicals were spilled, exploded, or stolen within a close proximity of a vulnerable population and/or environment, but the local fire and police were able to contain the damage quickly, efficiently, and without outside jurisdictional assistance.

A Low risk rating would be associated to a chemical spill that was reported at a facility that exists in the periphery of Redmond and local emergency personnel were able to contain and clean up the hazardous material incident.

IV. Capabilities

Redmond Fire Haz-Mat teams, in cooperation with the Eastside Haz-Mat Team, have primary responsibility for an incident. The team is well trained and capable of managing foreseeable incidents. However, Public Works should also be added to the notification list for management of ground water contamination.

V. Links

For further information about hazardous materials:
http://www.hazmat.dot.gov
http://www.emergency.com/hzmtpage.htm

HEAT WAVES

I. Hazard Profile

"North American summers are hot. Most summers see heat waves in one section or another of the United States. East of the Rockies, summers tend to combine both high temperatures and high humidity, although some of the worst have been catastrophically dry. Heat kills by taxing the human body beyond its abilities. In a normal year, about 175 Americans succumb to the demands of summer heat. Among the large continental family of natural hazards, only the cold of winter – not lightning, hurricanes, tornadoes, floods, or earthquakes – takes a greater toll. In the 40-year period from 1936 through 1975, nearly 20,000 people were killed in the United States by the effects of heat and solar radiation. In the disastrous heat wave of 1980, more than 1,250 people died."

The numbers quoted in the previous paragraph represent deaths from the direct effects of a heat wave. The indirect, or secondary, effects include mortality and illness in people with existing health conditions, to the very young, and to the aged.

Source: http://weather.noaa.gov/weather/hwave.html

A. Location

The climate of Redmond, like the rest of the Pacific Northwest, is typically temperate and comfortable. Although heat waves can potentially occur in Redmond, they are unusual occurrences for the prevailing climate and residential woodland setting.

B. Severity

Historically, extremely high temperature periods in Redmond have been of short duration.

C. Probability

There are no known heat waves to have occurred in the Redmond area. There is a low probability of a heat wave of any magnitude affecting Redmond.

D. Warning

The National Weather Service issues alerts, advisories, and warnings of severe heat conditions. NWS bases its determination of whether to issue an advisory or a warning on the Heat Index (HI). Some regions and municipalities are more sensitive to heat than others. As a result, NWS has set different thresholds of extreme heat for different places. NWS uses a common guideline of maximum daytime HI that is expected to equal or exceed 105°F and an expected nighttime minimum HI of 80°F or above for two or more consecutive days for the issuance of excessive heat alerts. NWS issues the HI forecasts for zones and cities in special public information statements.

II. Vulnerability

A. Natural

The natural environment will be dried out by heat causing vulnerability to diseases and fire. Additionally, heat waves can cause an increase in water temperature. This in turn can be detrimental to fish habitat.

B. Manmade

It is not uncommon around the Puget Sound for houses not to have air conditioning, potentially leaving many people exposed to inhospitable environments. The most vulnerable are the elderly, small children, chronic invalids, those on certain medications or drugs, and persons with weight and alcohol problems.

C. Systems

During heat waves, the emergency medical and dispatch systems will work hard. It is likely that they will incur resource shortfalls.

III. Risk Rating

Redmond has a low risk for the occurrence of a heat wave of any length or severity.

IV. Links

Excellent resource – Social Aspects of Weather: Summer/Winter. National Center for Atmospheric Research Environmental and Societal Impacts Group
http://www.esig.ucar.edu/socasp/summer-winter.html

LANDSLIDES

I. Hazard Profile

Landslides are the release of rock, soil, or other debris and its subsequent movement down a slope or hillside. They are generally caused or controlled by a combination of geology, gravity, weather, groundwater, waves, and human activity. Although gravity acting on a steep slope is the primary reason for a landslide, they often occur as these factors converge or are triggered by an event such as a large earthquake.

Other causes and contributing factors include:

- Erosion by rivers, glaciers, or ocean waves creates overstepped slopes.
- Rock and soil slopes are weakened through saturation by snowmelt or heavy rains.
- Earthquakes create stresses that make weak slopes fail.
- Volcanic eruptions produce loose ash deposits, heavy rain, and debris flows.
- Vibrations from machinery, traffic, blasting, and even thunder may trigger failure of weak slopes.
- Excess weight from accumulation of rain or snow, stockpiling of rock or ore, from waste piles, or from manmade structures may stress weak slopes to failure.
- Poor development practices

Slope material that becomes saturated with water may develop a debris flow or mud flow. The resulting slurry of rock and mud may pick up trees, houses, and cars, thus blocking bridges and tributaries and causing flooding along its path.

Landslides vary greatly in size and composition, from a thin mass of soil a few yards wide to deep-seated bedrock slides miles across. The travel rate of a landslide can range from a few inches per month to many feet per second depending on the slope, type of material, and moisture content.

A. Location

The Puget Sound region is relatively prone to landslides, especially where combinations of slopes, soils, geology, and vegetation are made susceptible to movement resulting from impacts

of heavy rains, ground tremors, forest fires, or other environmental shocks. Examples include areas of regular debris flows or where pumping of underground aquifers occur.

Within the City of Redmond, many areas are characterized by steep slopes and are at risk of landslides. The largest contiguous areas are the northwestern slopes above Lake Sammamish, north of Redmond-Kirkland Road, and eastern slopes north of Avondale Road. Currently developed with low-density, single family homes, the area is generally wooded and interspersed with native vegetation along several ravines feeding the lake below.

B. Severity

The State of Washington rates landslide losses second to flood losses for the state as a whole, with the Puget Sound basin having the greatest vulnerability. This is because of increased population density and development on and below bluffs and slopes.

As referenced in a series of sensitive area maps, Redmond has several landslide hazard areas ranging from low to very high hazard rating. Areas with the largest landslide risk are generally at some distance from development, although an event would likely impact roads and lifelines.

Slopes with vegetation such as trees and shrubs can be less vulnerable to surface slides depending on the root depth relative to the slip plane. Root systems serve the function of stabilizing hillside banks, giving soils more structure. Since Redmond's eastern neighborhoods are generally wooded in the steepest areas, potential impacts may have been lessened.

C. Probability

There are many active slide areas identified within the City. These have been mapped and may flow into homes or block major roads. During periods of heavy moisture, these areas could easily be triggered.

> ***Warning***: Generally speaking, the highest risk landslides are very fast moving and provide little advance warning. Tilting trees can provide a visual warning system to slower-moving landslides. Other immediate danger signals include rapid water or slurry flow impacting the structure, irregular flow that precedes debris dam bursting, ground or structural cracks opening, structures making noises, and walls and/or floors tilting. These cases would signal the need to evacuate immediately.

II. Vulnerabilities

A. Natural

Natural system losses may include trees, shrubs, and stream ecology along the series of east-west ravines, the Lake Sammamish shoreline, public park areas, and related wildlife.

B. Manmade

Manmade elements vulnerable to landslides include loss of or damage to homes, private property, public buildings, and commercial enterprises. These may be buried, shifted off foundations or otherwise made unstable. Human lives are potentially at stake from a fast-moving landslide. Lifelines and infrastructure may be blocked, limiting residents' access to

roads, power, and communications especially during an area-wide problem such as an earthquake event.

Redmond's eastern neighborhoods are particularly isolated, being bounded by the lake to the east, steep slopes to the west, and generally characterized by a series of cul-de-sacs extending into ravines. Homes that depend upon the few roads that run north-south are especially vulnerable if landslide debris outflows onto the roads below.

The potential number of residents impacted relate to the number of homes located on or above the slope, number of homes below a potential debris outflow, and number of homes built before the landslide building code went into effect.

If future development continues in high-risk areas, vulnerability will increase. The greatest risk is to individual residential structures on or below bluffs or slopes and those residents who rely upon landslide-vulnerable roads, pipelines, and electrical and communications lines.

Residents in multifamily housing developments along Avondale Road are particularly at risk, as are West Lake Sammamish neighborhoods relying upon Lake Sammamish Boulevard.

C. Systems

Depending on the degree that lifelines are blocked, business interruption could result and government's provision of services may be compromised.

III. Risk Rating

The Puget Lowland bluffs have experienced landslides for thousands of years. Bluff retreat is a normal process. Some of the small-scale but still potentially destructive retreats occur continuously. The larger landslides tend to be more episodic. When heavy winter precipitation is added to bluff sediments, unstable parts of the slope tend to fail. The frequency over time and space of these failures increases during and after particularly heavy rains. In some places, human activities, such as poor construction practices, have exacerbated the rate of bluff retreat by land sliding.

Given that Redmond has several steep-sloped areas bordering a lake and landslides are commonly a secondary hazard associated with earthquake, winter storms, and many other contributing causes, there is a high probability of their occurrence in these locations. However, the combination of low-density residential zoning, quality development practices, engineered drainage solutions, native or remnant landscaping, and the ample resources of its residents temper the severity of expected impacts. Even if individual losses are lessened by these measures, interruption to lifelines, access, and business activity may still occur bringing the rating up again. Because of this, a high risk rating is assigned.

IV. Links

United States Geological Survey – Program on Landslides
http://landslides.usgs.gov/html_files/landslides/program.html
Washington State Department of Natural Resources – Landslide documents
http://www.wa.gov/dnr/htdocs/ger/landslid.htm

Puget Sound Bluffs: The Where, Why, and When of Landslides Following the Holiday 1996/97 Storms, by Wendy J. Gerstel, Matthew J. Brunengo, William S. Lingley, Jr., Robert L. Logan, Hugh Shipman, and Timothy J. Walsh.

TERRORISM

I. Hazard Profile

The terrorists of today are not under any one person's or nation's control and governance but are associated with various national and international communities and movements.

Domestic Terrorism: The unlawful use or threat of force or violence by a group or individual based and operating entirely within the United States and without foreign direction.

International Terrorism: The unlawful use of force or violence committed by a group or individual who has some connection to a foreign power.

Secondary Hazards: The secondary hazards of a terrorist attack could range anywhere from minor to severe effects depending on the type of attack and location. In any event, there is the possibility of community utilities being impacted.

A. Location

Businesses in Redmond could become targets for terrorism. The high profile businesses that would be symbolic are located along the SR 520 corridor between downtown Redmond and Bellevue.

B. Severity

This information is under a separate cover and is not for publication.

C. Probability

Recent terrorist acts include the 1988 bombing of Pan Am Flight 103 over Lockerbie, Scotland, the 1993 bombing of the World Trade Center in New York City, the 1995 bombing of the federal office building in Oklahoma City, and the 1996 bombing at the Atlanta Olympics. In 1995, a militia group committed a series of domestic terrorist acts and bank robberies in Spokane to bring attention to their cause and to finance their militia activities.

With this increase in terrorist activities within the past few years, it could be conceivable that a domestic or international terrorist attack could happen in Redmond. Therefore, it is in the best interest of the City to initiate a comprehensive analysis of potential terrorist targets in the City and measure the present capabilities that the City has to deal with such threats.

There is no known record or documentation of terrorist activities within Redmond's city limits. However, the recent capture of known terrorist Hamad Rasam shows that terrorism in the Pacific Northwest is becoming a real danger.

II. Vulnerabilities

A. Natural

Drinking water, air, and public parks could be potential terrorist targets.

B. Manmade

Considering the "international crossroads" of Redmond's many world headquarters, these and other entities could be targeted.

- Microsoft Corporation
- Safeco Insurance
- AT & T Wireless Headquarters
- Hospitals
- Research Facilities
- Technology Research Facilities
- Sources for Drinking Water
- Olympic Williams Pipeline
- Nintendo Corporation
- Group Health Substations
- Rocket Research Facilities
- Public Facilities/Parks
- Fuel Depots

C. Systems

Some of the systems in Redmond that would be potential terrorist targets are the Olympic Pipeline system, transportation system, and public support systems like retirement homes, public housing, sewer systems, drinking water systems, and computer systems.

III. Risk Rating

Terrorist activities in Redmond have a moderate vulnerability rating. The City of Redmond is home base to many businesses that operate internationally, providing a range of potentially interesting targets for a terrorist "looking to make a statement."

IV. Links

For further information on terrorism, please refer to the following links.

http://www.terrorism.com/index.shtml
http://www.fema.gov/library/terror.htm
http://www.fema.gov/nwz01/nwz01_33.htm
http://www.st-and.ac.uk/academic/intrel/research/cstpv/

WILDFIRE

I. Hazard Profile

A wildfire is "any instance of uncontrolled burning in grasslands, brush, or woodlands," whereas “uncontrolled burning within a forested area is a forest fire.” For most of this hazard profile, the word "wildfire" encompasses “forest fire” as well. The distinction is important mainly to clarify that wildfires do occur in non-forested areas.

Hazards Secondary to Wildfire/Forest Fire:

- Landslides, mudslides, more intense water run-off (potential long-term hazard)
- Deadfall of scorched trees (potential long-term hazard)
- Ignition source for flammable and explosive materials
- Smoke and particulates reduce air quality – trouble especially for people with respiratory ailments
- Volatilized hazardous waste – toxic clouds or plumes
- Damaged infrastructure, such as roads, water supply pipes, sewer, presents possible health and safety risks.

The wildfire near Los Alamos, New Mexico (Cerro Grande Fire) in May of 2000 is an interesting case study of a wildfire and its secondary hazards. The Cerro Grande Fire also exhibited the classic characteristics of a hard or impossible to control wildfire moving from wildlands to urbanized areas through the urban/wildland interface.

Sources:

The Los Alamos Cerro Grande Fire: An Abject, Object Lesson
http://www.Colorado.EDU/hazards/o/whtmtst.htm
Cerro Grande Fire, National Park Service, Bandelier National Monument
http://www.fs.fed.us/r3/sfe/fire/cerrogrande/

Urban/Wildland Interface

The urban/wildland interface is the area or areas in which houses and non-residential structures, like businesses, public buildings and utility stations, encroach on an undeveloped, natural resource area. The term, "wildland" seems inappropriate to describe the undeveloped areas in Redmond. In the case of Redmond, the interface may be better described as the places where houses and other structures are up against and amidst trees, brush, and grassy areas whether or not residents consider these areas "wild."

The other important distinction in the description of fire hazard for Redmond is that a conflagration of burning structures, houses, or commercial buildings is different than a wildfire. The distinction becomes blurred in the case of a fire underway in the interface between structures and wildlands.

A. Location

The location and extent of a wildfire will depend upon land cover, topography, and weather. In theory, a wildfire continues to blaze and cover more ground until it runs out of fuel or the conditions conducive to fire terminate.

B. Severity

The severity of wildfire in Redmond will depend upon the same conditions as described in Location. Wildfires are of an interesting subset of hazards that perpetuate themselves. For these hazards, the severity of the hazard dictates the location and extent of the hazard.

Three rankings of severity of wildfire range as follows:

High: An intense, all-consuming fire that affects large acreage in Redmond either in several locations or as a contiguous front. The possibility of secondary hazards as a result is high.

Moderate: An intense, all-consuming fire that affects small acreage in Redmond, perhaps spotty in several locations, or a cooler fire that burns the available fuels less completely over a large area.

Low: An intense, all-consuming fire in a small, discrete area, or a cooler fire that burns the available fuel less completely over a small area.

C. Probability

Under normal conditions, there is a low probability of a widespread wildfire in Redmond. The probability increases in long periods of drought, such as the prevailing conditions of 2000 to 2001, and when there is extra fuel available following a cycle of new growth from earlier heavy rains.

Fire cycles in the Western Cascades range from 200 to 400 years. The intervals between major fires increase in length from the south to the north. Experts have dated three massive, regional fire episodes in the past 750 years.

"In normal summers, sparks during dry spells can burn withered grasses, needles, and underbrush, but larger materials – the so-called 1,000-hour fuels of thicker standing or downed timber – retain enough moisture that they merely smolder" (Welch). Drought conditions significantly increase the odds of catastrophic fire occurrence. Long periods of dry conditions, large amounts of drying fuel, and wind make for wildfire outbreaks. The necessary spark for a fire may come from human activity or natural sources like lightning.

Usually, there are about 1,500 lightning strikes during the summer and early fall in Washington. However, in August of 1999 there were more than 10,000 strikes in less than one week.

Regional Wildfire History

In 1995, 80-mph winds stoked a previously extinguished fire in a Plum Creek Timber slash pile into a 300-acre wildfire that threatened Cumberland, Washington. In the summer of 1991, summer fires burned 700,000 acres along the western Cascades from Eugene, Oregon to

Bellingham, Washington. One hundred years ago, the Yacolt Fire in southwest Washington, killed 38 people in 36 hours and charred 240,000 acres. A wildfire in 1701 burned from Shelton to Port Angeles. Scientists believe that event was linked to a big subduction zone earthquake in the previous year that created massive fuel loading in the form of toppled, dead trees.

Factors that contribute to the likelihood of wildfire occurrence:

- Hot, droughty weather
- Wind
- Fuel loading
- Ignition sources, human and natural
- Steep slopes – fire moves quickly up a slope, slowly down a slope
- Aspect and the accompanying effect on temperature and evaporation

Sources:

Craig Welch, Seattle Times Staff Reporter, 2001. "Wildfire Worries: Sweating in Our Dry State" Seattle Times, Local News: Sunday, April 08, 2001.
http://archives.seattletimes.nwsource.com/cgi-bin/texis/web/vortex/display?slug=wildfire08m&date=20010408&query=wildfire
Wildland Fire Assessment System
http://www.fs.fed.us/land/wfas/welcome.htm

D. Warning

The Seattle office of the National Weather Service has a fire weather office charged with providing information about fire danger through forecasts and outlooks of weather conditions conducive to wildfire.

Link: http://www.seawfo.noaa.gov/fire/olm/fire/seafwx.htm

II. Vulnerability

A. Natural

Human lives are at risk in a wildfire. The trees, shrubs, and grasses that make up the fuel for the fire and the habitat they provide are vulnerable. The increased run-off (secondary hazard) after a fire could impair salmon runs.

B. Manmade

Homes, commercial buildings, public buildings, and other structures tucked in amongst trees and brush are at a greater risk for wildfire. Landscaping in Redmond often encourages the planting and growth of combustible vegetation immediately surrounding the structure.

C. Systems

Disruption to business, economic, and residents' daily activities is a systemic vulnerability. If the City's residents needed to evacuate, traffic congestion and access in and out of Redmond could

be very significantly compromised, creating greater risk to human life. The same is true for traffic flowing through the Redmond area.

Redmond has a low vulnerability to widespread wildfire under normal weather conditions. The infrequency of wildfire in Redmond, however, may actually increase the vulnerability to wildfire by discouraging preventative measures in site planning, landscaping, and construction that could reduce overall vulnerability. In prolonged drought periods, the vulnerability of Redmond to wildfire increases enough to warrant action.

The FIREWISE website has an interactive tool online that allows the user to assess risk rating for an individual home in the urban/wildland interface. http://www.firewise.org/pubs/WHAM/nfpa/

III. Risk Rating

Redmond has a low, but significant, level of risk of widespread wildfire under weather conditions that accompany periodic droughts. The risk of localized wildfire outbreaks is moderate under the same conditions.

An overall low risk rating was given in a large part because of the City of Redmond's fire suppression capability. The City has a well-trained and funded Fire Department, the road and hydrant networks are excellent, and all properties have addresses.

IV. Capability

Outdoor burning regulations adopted by the Puget Sound Clean Air Agency (PSCAA) prohibit outdoor fires in the "carbon monoxide non-attainment area." This area, defined by PSCAA, includes the urban areas of King, Pierce, and Snohomish counties. The entire City of Redmond and portions of King County Fire District 34 fall within this no-burn area.

With a burn permit, Redmond Fire Department and King County Fire District 34 will allow residential and land clear burning in some areas of the fire district during the months of March, April, May, October, November, and December. The permitting process regulates air quality and serves to prevent wildfire ignition sources.
http://www.ci.redmond.wa.us/insidecityhall/fire/prevention/permitsburn.asp

Private citizens in Redmond can take simple, practical measures to improve the fire resistance of their property. To reduce the threat of a fire starting around your home or of having your home swept up in a nearby fire, the Department of Natural Resources recommends the following precautions.

- Ask your power company to remove or prune trees that could fall and break a power line.
- Visibly post your home address and clear away driveway obstacles to improve emergency vehicle access.
- Locate nearby sources of water that firefighters can tap.
- Create a fire-defensible space by moving stacked firewood and other flammable materials away from your home.
- Develop home landscaping that emphasizes open space and fire resistant plants.

- Clear your roof and gutters of tree leaves and needles, and trim back overhanging vegetation.

V. Links

PSCAA: http://www.pscleanair.org/
Redmond Fire: http://www.ci.redmond.wa.us/insidecityhall/fire/fire.asp
http://www.wa.gov/dnr/htdocs/adm/comm/nr01-034.htm

WINTER STORMS

I. Hazard Profile

Destructive storms come in several varieties: wind, rain, ice, snow, and combinations. Nearly all destructive local storms occur from November through April when the jet stream is over the West Coast and Pacific low-pressure systems are more frequent. The trajectory of these systems determines their effect locally. The more southerly ones bring heavy rains while the more northerly ones bring cold air and the potential for snow and ice. Any winter storm, regardless of its trajectory, can pack high winds. Generally, winds above about 30 miles per hour can cause widespread damage, and those above about 50 miles per hour can be disastrous.

A. Location

The entire City of Redmond is vulnerable in a severe winter storm. Microclimates within the area vary in vulnerability to specific storm impacts, such as ice jams, wind exposure, or lightning.

B. Severity

Redmond's hillside and valley topography creates a wind tunnel, increasing exposure and behavior of air movement and bringing snow, ice, or heavy rains. Since residential development patterns are somewhat isolated in cul-de-sacs feeding off a common arterial, there is a high degree of reliance on a few key roads, so residents may be at risk by limited access. Damage due to saturated ground and falling trees also raises the severity rating.

C. Probability

Storm history, evidenced by the Winter Storm of 1996-97, the Columbus Day Storm of 1993, and the Inaugural Day Storm of 1962, suggests a high probability of occurrence in the City of Redmond and the Puget Sound region.

D. Warning

Weather reports and forecasts provide a few days lead-time in predicting the timing and severity of storm system impacts.

II. Vulnerability

A. Natural

In the event of a winter storm, natural systems continue to adapt and change. Prolonged heavy rains cause the ground to be saturated, rivers and streams to rise, and often result in local flooding and landslides. Melting snow adds to river loading and can turn an otherwise benign situation into a local disaster.

While there may be losses or environmental change impacting vegetation, stream or shoreline ecology, parks, or related wildlife, these features may be more vulnerable to human activities disrupted by the storm, such as wastewater overflows, petroleum pipeline bursts or other chemical spills, diverted groundwater recharge, and poor development practices, for example.

B. Manmade

Winter storms can be deadly. Human life is especially vulnerable from exposure in freezing weather, accidents while driving or falling on icy roads, injury or death from falling trees, and downed power lines. Falling trees and debris may damage homes, private property, public buildings, and commercial enterprises. Snow accumulations can cause roofs to collapse. Snow accompanied by high winds is a blizzard, which can affect visibility, cause large drifts, and strand residents for up to several days. Residents without food or water may attempt to use impassable roads and thereby increase the number of potential rescues.

C. Systems

High winds can cause widespread damage to trees and power lines and interrupt transportation, communications, and power distribution. Snow or ice storms can impact transportation, electrical, and telecommunication systems. These storms also disrupt the response. In general, the lifeline infrastructure may be compromised, such as limited access to roads, power, and communication. Widespread business interruption and economic losses would be expected.

D. Vulnerability Rating

This is a medium-density, residential population. Within the urban area, the access to provision of services exposure is relatively low; however, access and response capabilities may be limited.

III. Risk Rating

Medium to high risk. The storm and ice have the capability of isolating many people in the Puget Sound region, while turning out the lights.

IV. Links

Winter Storms Fact Sheet- http://www.fema.gov

Hazard Identification Vulnerability Analysis Attachment Guide

Attachment One: Seismic Hazard-Land Use Map

Attachment Two: Landslide Hazard-Land Use Map

Attachment Three: Wetlands

Attachment Four: Aquifer Recharge Area

Attachment Five: Critical Erosion Hazard Areas

Attachment Six: Floodplains

Attachment Seven: Streams Classification

Attachment Eight: Red Zone District 34

Attachment Nine: Risk – Wildfire Urban Intermix in King County, WA

Attachment Ten: Critical Facilities List

Draft *Risk: Wildfire Urban Intermix in King County, Washington*

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Institute for Hazard Mitigation
University of Washington

Introduction

Wildland fires pose a serious threat to human life and property, especially when homes are built in fire-prone ecosystems. Washington and other western states have an increasing incidence of intermix fire issues due to the growth of vulnerable communities being built in fire "intermix" areas. Intermix areas are the areas of natural fuel coverage that blends with human infrastructure or settlements. In developing this urban intermix risk model for King County, the authors hope to identify the scope and nature of the risk to King County communities and develop a tool that is useful for sensitive area planning, hazard and vulnerability mitigation, and fire preplanning. The model we used has a potential risk rating total of 15 points. These are given for ignition possibility, urban density, and fuel (type and condition). The range in King County was found to be from 2.25 – 10.25, but much of the eastside was found to be between 7 and 9 and there is reason to believe that parts of the county may rate as high as an 11. The mean is 5.8 with a standard deviation of 1.97.

King County faces both problems of interface and urban intermix issues. The vegetation in the county grows thickly from heavy rains. This has been compounded by years of aggressive fire fighting that has caused an unnatural and unhealthy buildup of fuels. This is an explosive combination that nationally destroys homes annually. California, the Rocky Mountain States, and eastern Washington have all experienced wildfire/urban intermix disasters in the last decade. Typically, western Washington is thought to be fire resistant. Firefighters have in the past referred to the area as the *asbestos forest*. It is a mistake to think that the forests of King County will not burn or that an investment in mitigation and preparedness is beyond the time horizon to capture benefit. Indeed, long-term fire fighting policy has intensified the hazard, and current growth policies will allow for rapidly increasing vulnerability. The terrain and fuel loads are good reasons to believe that the conditions for a project fire in the urban intermix area are high. The Washington Department of Natural Resources has indicated that there is a 50% chance of a catastrophic fire in western Washington this year. Typically western Washington has a low wildfire hazards rating due to fuel moisture and lack of lightning. While it is doubtful that early season fires will become prevalent as they are in many of the western states, by the late season the fuels are typically very dry. The abundance of fuel on the ground will allow a fire to grow rapidly, so any fire that does start can rapidly get out of hand. The probable interface fire disaster in western Washington would coincide with three things: 1) an extended period of drought, 2) an unusually hot summer, and 3) an active fire season in the western states. The latter is not only an indicator but will mean that our wildfire crews will be out of position.

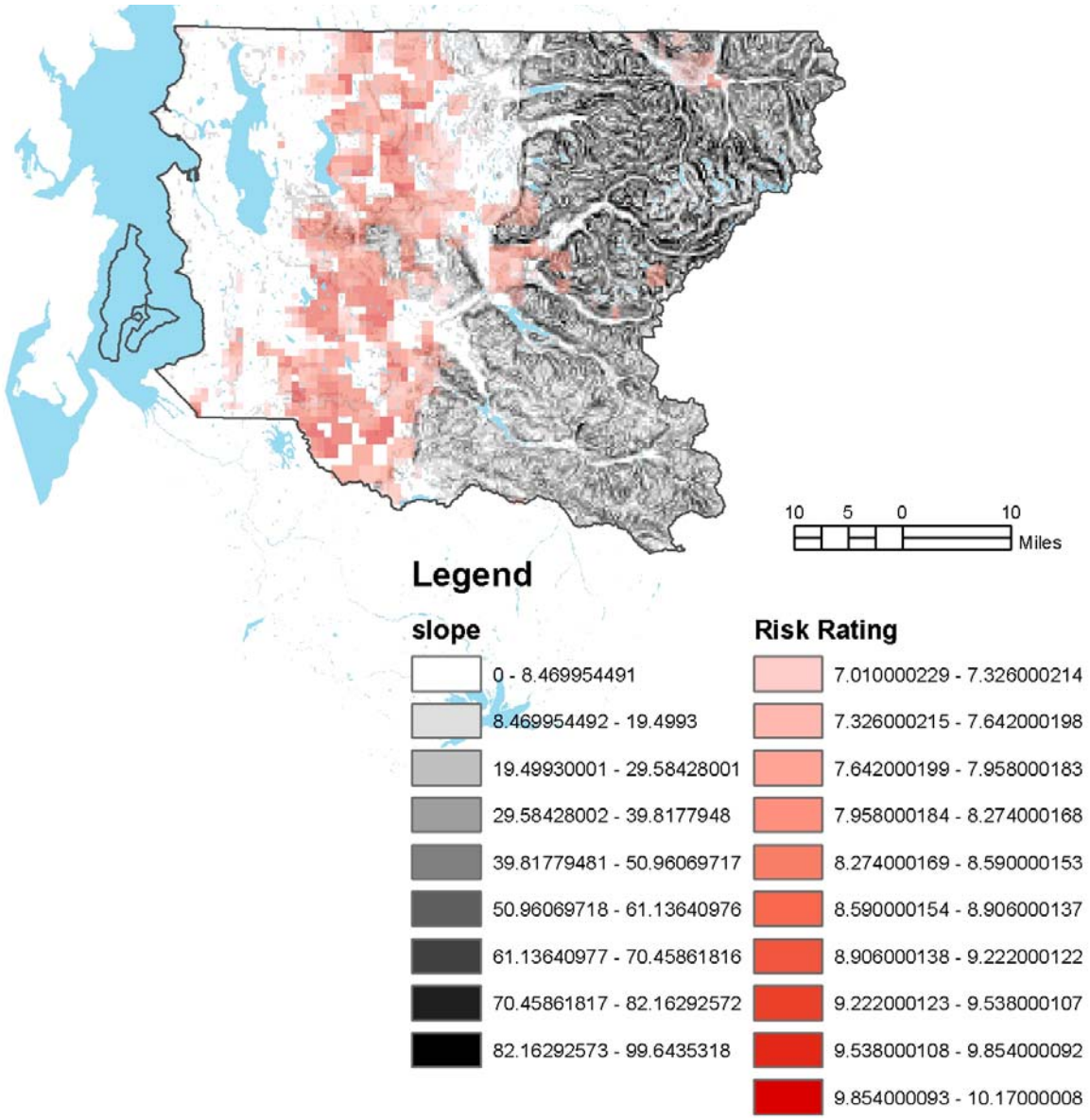
In the natural state, fire is a part of the ecology of the forest. It generates vitality in the forest. The vast majority of fires will not burn hot enough to destroy trees. The fire eliminates the excess fuel load, creates space for tree propagation, and the heat opens the cones of several species of plants. The recognition that the burning of routine fires greatly reduces the risk of fire disasters has driven "let burn" policies, prescribed burns, and fuel reduction programs. A significant problem emerges with the introduction of urban fuels. Urban interfaces make "let burn" and prescribed burn policies much more problematic. Consider that any miscalculation can put houses at risk. In this environment, any responsible agency would be nervous about allowing a burn to reduce fire vulnerability.

Fires have a variety of causes both man-made and natural. In several parts of the country, the deliberate ignition of wild fire is a significant problem. This is a routine issue in California, and in 2002 the Show Low fire in Arizona was deliberately started. It is not unfeasible that terrorists could choose to monitor fire conditions and plan to attack the vulnerability in the intermix area. A coordinated effort could overwhelm the response capability.

Fires advance through the transmission of heat (condition, convection, radiation, and "rollies"). Rollies is a term used by the wildland fire community. It means fuel that is on fire rolling down the hill, such as a log, and so it is actually conduction. Fire expands fastest during the day when the air is warmer. During the day, the fire wants to travel uphill. As the air warms, the local air currents rise and fire follows. At night the fire will slow and travel

downhill following the cooling airflow. In general, night offers the best opportunity for containment. During the day while the fire wants to travel uphill, convection currents and radiation ahead of the fire will preheat the fuels and air upslope. Radiation has an extreme impact when the fire enters a chimney. This is a v-shaped area on a slope. Additionally, south and west facing slopes tend to be warmest and driest. The situation of heavy dry fuels on a slope, with chimneys, on a hot day will allow for rapid expansion of the fire. The heat rising from such a fire will create a thermal column that can rise hundreds or thousands of vertical feet. These vertical columns carry burning embers that are then picked up by prevailing winds and spread. These conditions are the crux of a worst-case scenario in King County.

Map 1 King County Wildfire Urban Intermix Risk



This year marks the 100th anniversary of the Yacolt Burn Fire in Clark County along the Columbia River – the biggest fire in the state's history and a testament to the fire potential in western Washington. The Yacolt event burned 238,900 acres and jumped the Columbia River. A burn the size of the Yacolt Burn has a natural occurrence of 200-500 years. The cause of the Yacolt was not natural but neither is the current condition of our forests. For years, forest fire experts have spread the concept of defensible space around buildings and this concept is extremely important, but the more global scope of this hazard does not easily lend itself to mitigation strictly at a local level. The new message is forest community health. Fire experts attribute the change in risk to increases in hazardous fuel brought about by a general decline in forest health. Forests are more crowded with trees that

struggle against each other for nutrition, water, and sunlight. Most are weakened and frequently infected with tree insects and diseases, and they burn hot and fast.

The type of ignition (man-made or natural) should be discounted in evaluating the risk. That is, if the conditions are right, many ignition sources exist. Mitigation efforts that limit human interaction with fuels can extend the fire cycle or change the location of ignition. However, if the fire cycle is extended and the fuel load is not mitigated then the ultimate fire with burn hotter, move faster, generate more secondary fires, and overwhelm response capabilities.

A worst-case scenario in King County would probably start away from the urban interface area. A fire on a south-facing slope will travel rapidly up a chimney. The area will be remote, so response will be slow. The initial fire-fighting tactic will be containment. Attacking the heads of the fire is extremely difficult under these conditions even if the resources are available. Before the firefighters have a chance to knock the fire down, a very hot vertical column carrying hot embers will develop. The embers will be carried miles by the hot dry prevailing winds. The deposition zone will be in the forests (starting the cycle over) in the intermix zones.

Problem Statement

The primary problem is that of limited resources in both mitigation and preparedness. There are several mitigation measures that can be taken: fuel reduction, fuel breaks, targeted housing codes, education, etc. Only by identifying the location and severity of the risk can an effective and cost efficient mitigation plan be derived. Targeted risk reduction is critical. The King County fire management community is typical in that it is multi-organizational and those with the most risk also tend to be the ones with the least resources. This wild fire intermix model should provide answers about where to target mitigation and preparedness efforts in the King County intermix.

Data Summary

In order to create this model, data was gathered from a variety of sources.

King County Roads –

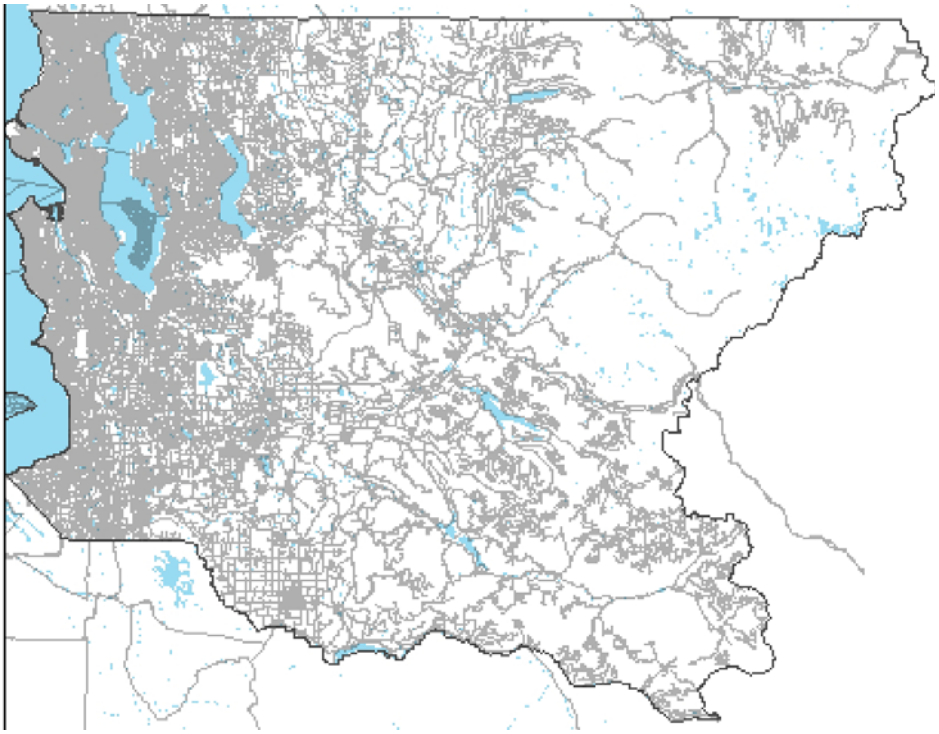
The King County roads data (actively used in the model) came from the King County GIS group. Map 2 is of the King County roads. For reference, the county boundaries and water (lakes, rivers) are included in the maps. This data was also provided by King County through WAGDA. The following information is taken from metadata provided by King County as catalogued by WAGDA.

File name: **KCSN**

Purpose: This coverage contains the features comprising the countywide road and street network, including such related transportation links as selected driveways, transit connections, alleys, etc. Attributes of the network arcs include address ranges, adjacent features, road classification, and other codes. Based on TIGER data, KCSN is suitable for general reference, small-scale map displays, and network analysis.

Source: The King County Street Network was derived from the United States 1990 Census Bureau TIGER line file. Since then the coverage has been updated by various sources at various scales. Primary early sources for enhancement were the Seattle Engineering Department Arc/Info street network with approximately 10 feet accuracy. Maintained by GIS group - Transit Infrastructure and Integration: Tamara Davis, Trang Bui.

Map 2 King County Roads

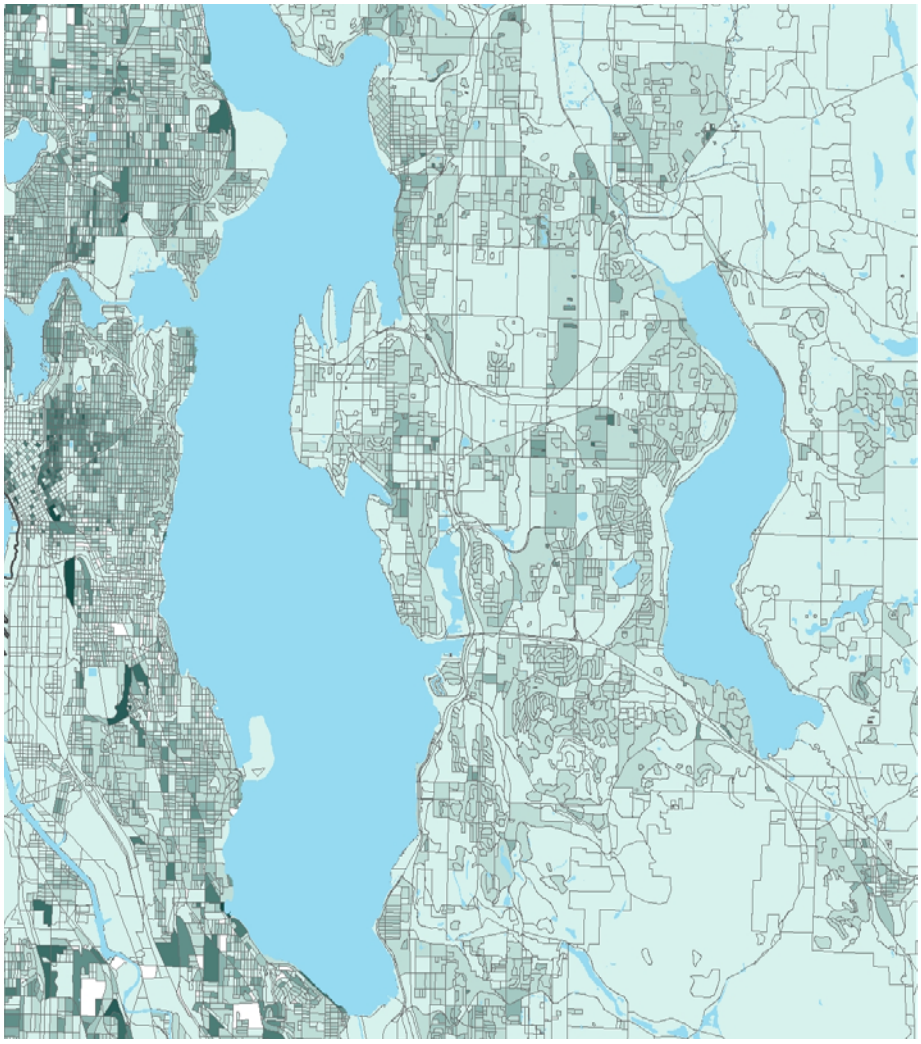


Census Block –

In order to derive housing density, 2000 block census data was used. This data came from the King County GIS group with permission from King County Emergency Management. The following information comes from the King County GIS website. http://www.metrokc.gov/gis/sdc/Content/census/blkgrp00.htm

File name: **BLKGRP00**
Subject category: 2000 Block Groups
Purpose: Census 2000 Block Group polygons for use with summary level 150 tabular data
Updated: 02-15-2003
Credits: U. S. Census, ESRI, King County GIS
History: Census 2000 Block level region coverage received from ESRI. Coverage projected to Washington State Plane North. Parcel boundaries were also used when a block edge was created by Census using line-of-sight across open land rather than a road, alley, or stream. Maintained by King Co. GIS Center: Chris Jansen, Michael Leathers.
Map 3 is a sample of the King County census block (part of the Eastside). In this map, housing units have been normalized by acres after acres were calculated. It is a housing density map. Darker is denser.

Map 3 Housing Density Sample (Bellevue, Issaquah, Redmond, Sammamish) Normalized Census Blocks



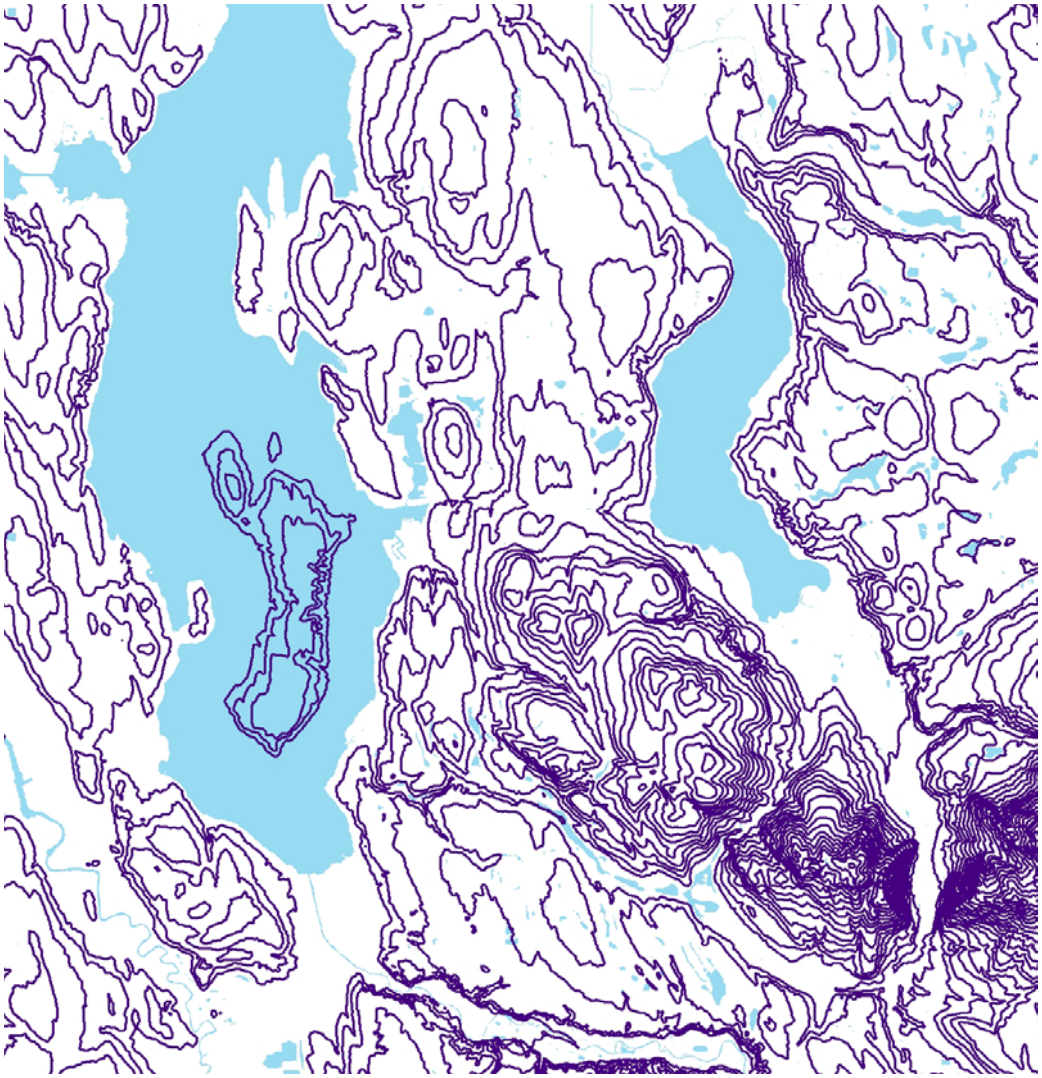
Topography – Slope and Aspect

In order to derive slope and aspect, both topographical data were used. This data came from the King County GIS group through WAGDA. The following information is provided by King County as cataloged in WAGDA.

File name: **CONT100**
Subject category: 100 ft Contour lines
Abstract: One hundred foot contour lines from 10 Meter DEM
Updated: 04-05-2000
Credits: WASHINGTON DNR

Maintained by King Co. GIS Center: Cheryl Wilder, Lisa Castle. Map 4 contains a portion of the county (Eastside, Bellevue, Issaquah, Redmond) as a topographical map 100 ft. contours.

Map 4 Sample Topographical Map – 100-Foot Contours

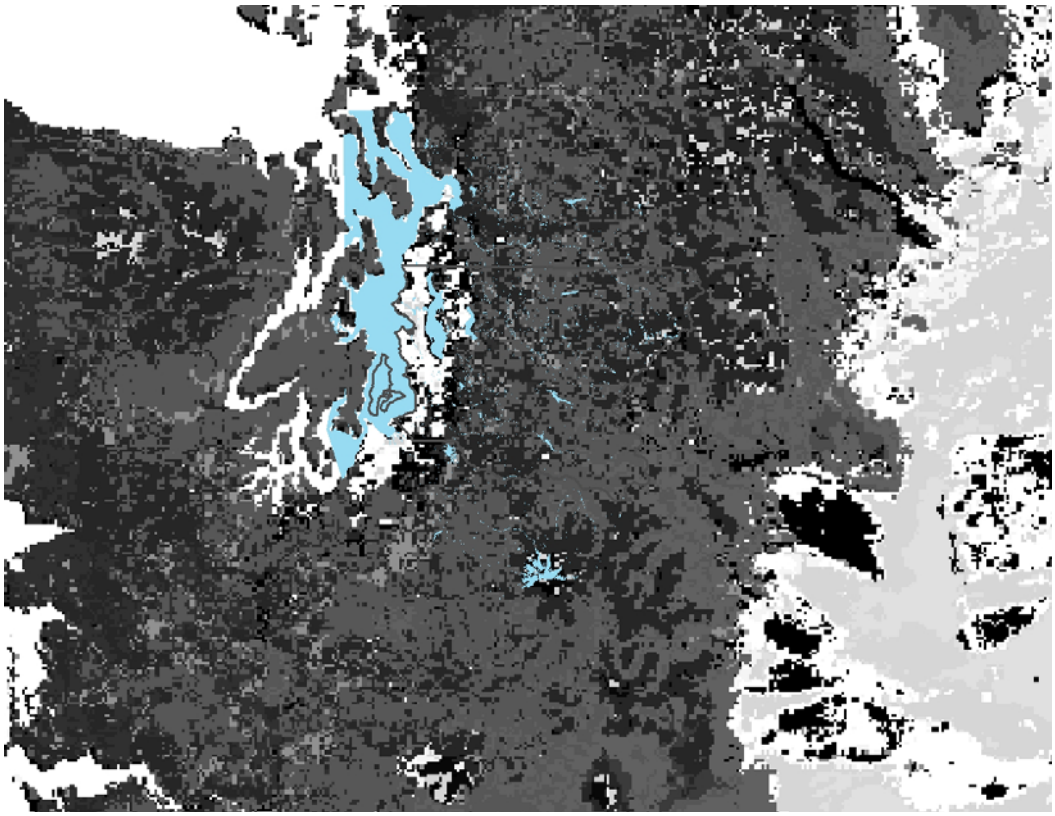


Fuel Cover –

In order to determine the fuel "hazard" and fuel disturbance regimes, a vegetation survey was used. It is in the form of a raster map. The codes for the fuel hazard and disturbance regime were taken from National Interagency Fire Center fuel codes. Map 5 is sample coverage from this National raster. The King County water layer is included for reference (note Lake Washington, Lake Sammamish).

Title: **Current Cover Types, Version 2000**
Originator: Fire Sciences Laboratory, Rocky Mountain Research Station
Publication Date: 20010331
Geospatial Data Presentation Form: map
Publication Place: Missoula, Montana
Publisher: Fire Sciences Laboratory, Rocky Mountain Research Station
Abstract: The cover types shown on this map depict the vegetative cover types currently present across the conterminous U.S. Data were developed by integrating two remotely sensed vegetation classifications: the 1990 Land Cover Characteristics map for non-forest types and the 1992 Resource Planning Act Forest Types. The data was not intended to be used at finer spatial scales.

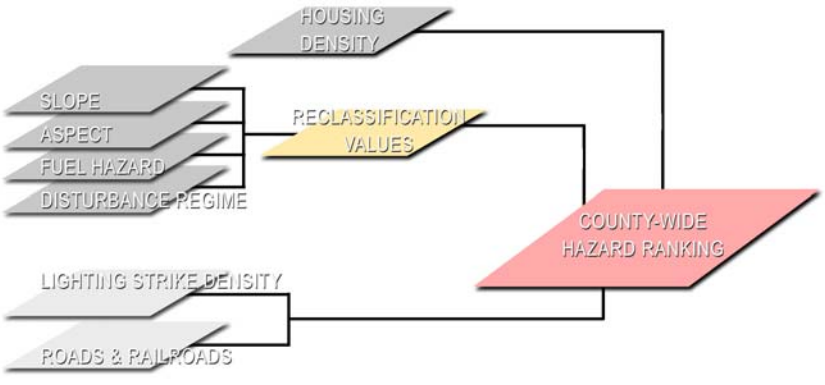
Map 5 Sample Map -- Vegetation Coverage Types



Methodology

This project followed the Colorado "Red Zone" methodology (Colorado Forest Service, May 2002). This methodology produces a "mid-level" assessment. Due to resolutions, this model can only produce a general of high-risk locations on a regional level. Fifteen total points are divided among 3 areas: 1) probability of fire ignition, 2) housing density, and 3) a weighted model (slope, aspect, fuel hazard, disturbance regime).

Figure 1 Methodology



Ignition –

The model calls for lightning strike and road buffer data. Any area within 100 meters of a road receives a point. The King County road data was buffered at 100 meters and then rasterized. Note: dissolving the road buffers required 8 hours.

The lightning strike scale is: Very Low – 1, Low – 2, Medium – 3, High – 4. The lightning strike data obtained from the Northwest Wildfire Coordinating Center did not load correctly, so we assumed the 1 point and added this to the final raster map. In reality, some of the eastern county might require an extra point; however, the urban area affected is minimal.

Housing Density –

Housing density was derived from the 2000 census data. Each census block area was converted to acres. Housing units were then divided by acres to produce housing density. Excel was used for the math, and the dbf file was joined to the census block table. The density was recoded according to the following formula:

0 - .0004 houses per acre	0
.0004 -.0025 houses per acre	3
.0025 - .1 houses per acre	4
.1 - .5 houses per acre	5
.5 –1 houses per acre	4
1 – 999 houses per acre	2

Fuel and Terrain –

The King County contours were converted into a raster file layer and analyzed for slope and aspect and then recoded.

Slope: 0-5% (1), 6-20% (2) 21-40% (3) 41+ (4).

Aspect: 160-0-200 degrees (1), 160-165 and 195-200 (2), 165-175 and 185-195 (3), 175-185 (4)

After re-projecting the fuel raster map, an x-coordinate shift was still necessary to line the raster up with the King County maps. The map was then cut according to the King County boundary shape file. This map was duplicated, and the two were reclassified. One map was produced for fuel hazard and the other for disturbance regime. The classifications were taken from the NIFC website, and each was ranked from 0-4.

Disturbance was multiplied by (.35), fuel hazard by (.4), slope by (.15) and aspect by (.1). The four-raster layers were then added together.

Combining the Layers –

The fuel and terrain housing density and ignition raster layers are added together. This produces the risk map according to the Red Zone methodology. The risk map produced by the Red Zone Methodology didn't seem to capture the risk area very well. Large areas that should have been captured as moderately high risk were not. Consequently, a second map was produced using the neighborhood statistics function. This made a dramatic change in the functionality of the map; however, the map also rated the wilderness area, watersheds, and Forest Service land. In the final version, the raster calculator was used to eliminate areas with no houses. In the final version of the map, only a risk rating of 1 (one) sigma or greater than the mean is used. This produced a map that is much more meaningful.

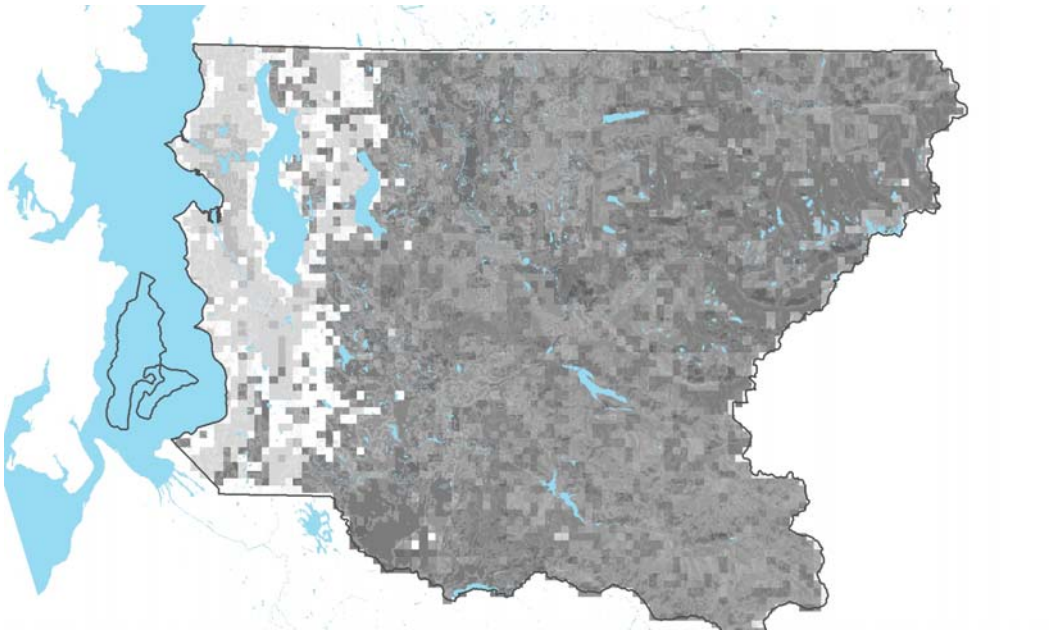
Analysis of Results

Map 6 is a weighted intercept of fuels and terrain according to the model – the darker the riskier. The pattern that emerges is for a significant increase in risk rating east of I-5 and I-405. The Issaquah Alps, North Bend, Enumclaw, and eastern slopes of the Snoqualmie Valley stand out. In Map 7, the recoded housing data is added. A clear zone emerges north-south through the middle of the county and up the I-90 corridor. Skykomish and part of the Federal Way area also stand out on this map. After reclassification, the mean for the fuel and terrain values are as follows. The fuel hazard has a mean of 2.6 and a sigma of .95. The disturbance regime mean is 2.39 and a sigma of 1.31. The mean for aspect is 1.69 with a sigma of .63, and the mean for slope is 2.56 with a sigma of 1.07. From the census, housing units per acre are 4.7 with a standard deviation of 11. Reclassified, they average 1.6 with a standard deviation of 1.9.

Figure 2 Fuels and Terrain Mean and Standard Deviation

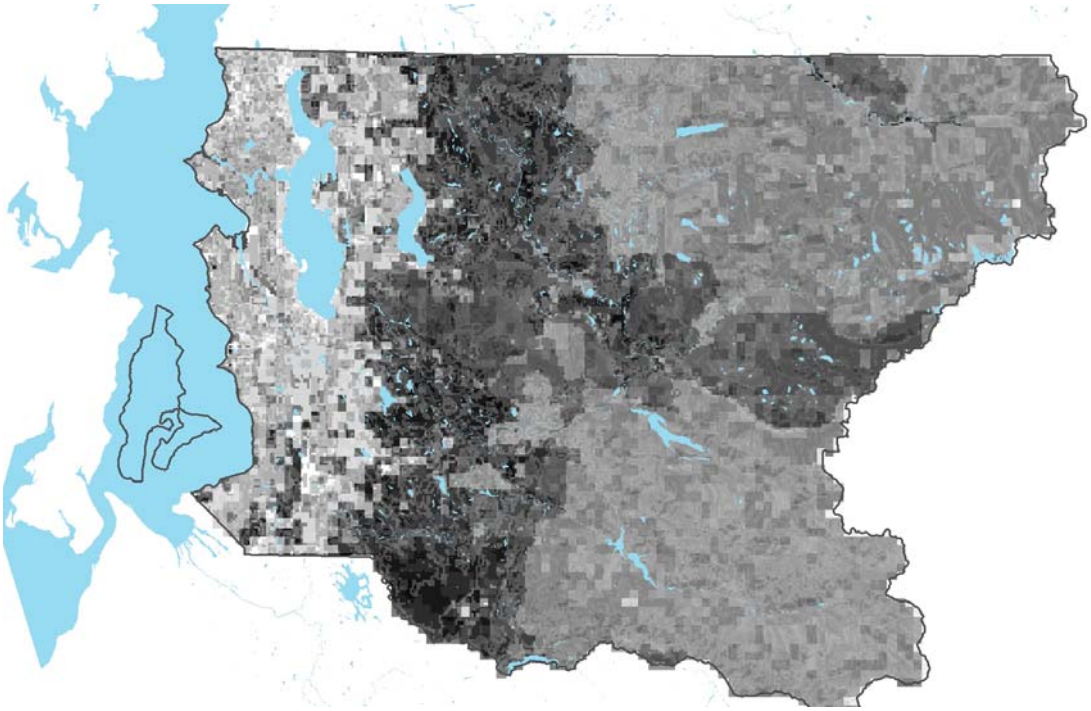
	Mean	sigma	Mean	sigma
Fuel Hazard	na	na	2.6	.95
Fuel Disturbance	na	na	2.39	1.31
Slope	24	19	2.56	1.07
Aspect	na	na	1.69	.63

Map 6 Fuel and Terrain Reclassified (weighted interception – fuel hazard, disturbance, slope, aspect)



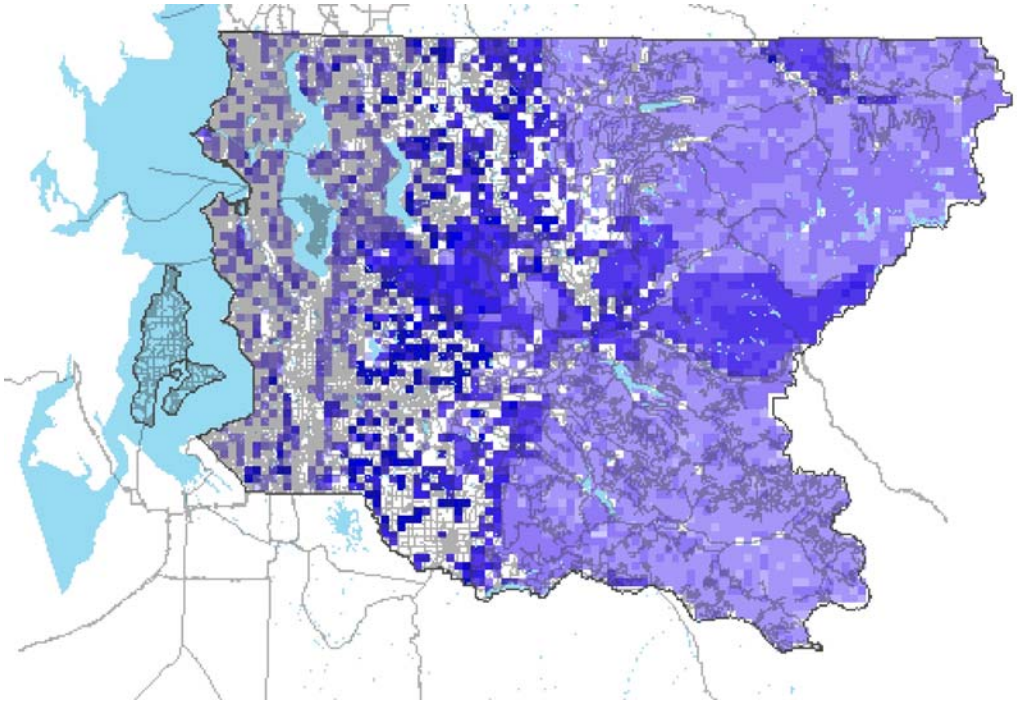
A problem with the fuel data is a result of the methodology. The Red Zone model really requires local fuel managers to rate the fuel classifications and fire regimes. While the ratings applied in the King County model seem to meet expectations, the authors are certainly not local fuel experts. This part of the process could be improved.

Map 7 Housing Density, Fuel, and Terrain

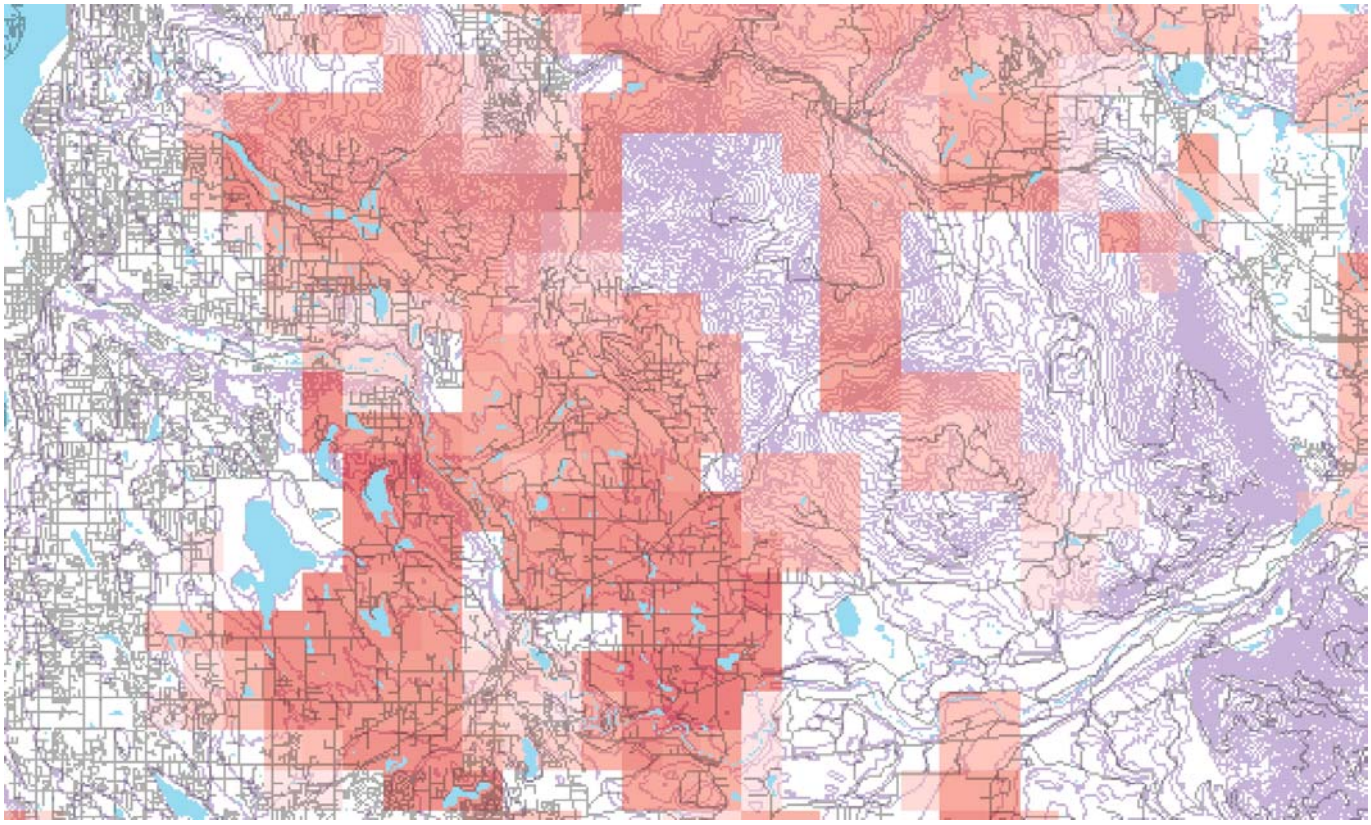


Map 8 is the original map produced by Red Zone methodology. Darker areas have a higher risk rating. The roads are in gray. Notice that the eastern side of the county (watershed and USFS land) is rated. Also some of the slopes, for instance along the Sammamish plateau, Novelty Hill, Education Hill, and others that clearly should have been selected, were not. In order to remove the unpopulated areas, the raster calculator was used to remove the unpopulated blocks. A neighborhood analysis was run, and this captured the areas that should have been captured. This can be seen in Map 1.

Map 8 Map Produced by Red Zone Methodology (roads in gray)



Map 9 Section of the Final Risk Area (Issaquah Alps) with 100-Foot Contours



As map 9 shows, the model has identified areas like the Issaquah Alps as high-risk areas. The red blocks above represent risk ratings of 7-9. This is at least 1 sigma above the risk mean. This is an area where development pattern, as well as slope and fuel type, pushes the risk rating.

Qualitatively, the final map seems to capture the riskiest areas. It does overstate the problem in some areas and understate the problem in others, but as an "intermediate" risk map, it definitely seems to work. The model is relatively sensitive to slope and aspect, and there are areas that should have rated higher using a 40-foot contour. However, the model is equally sensitive to the 100-meter road buffer. Between this and the housing density (census block) data, areas without houses show up in the red zone.

Conclusions –

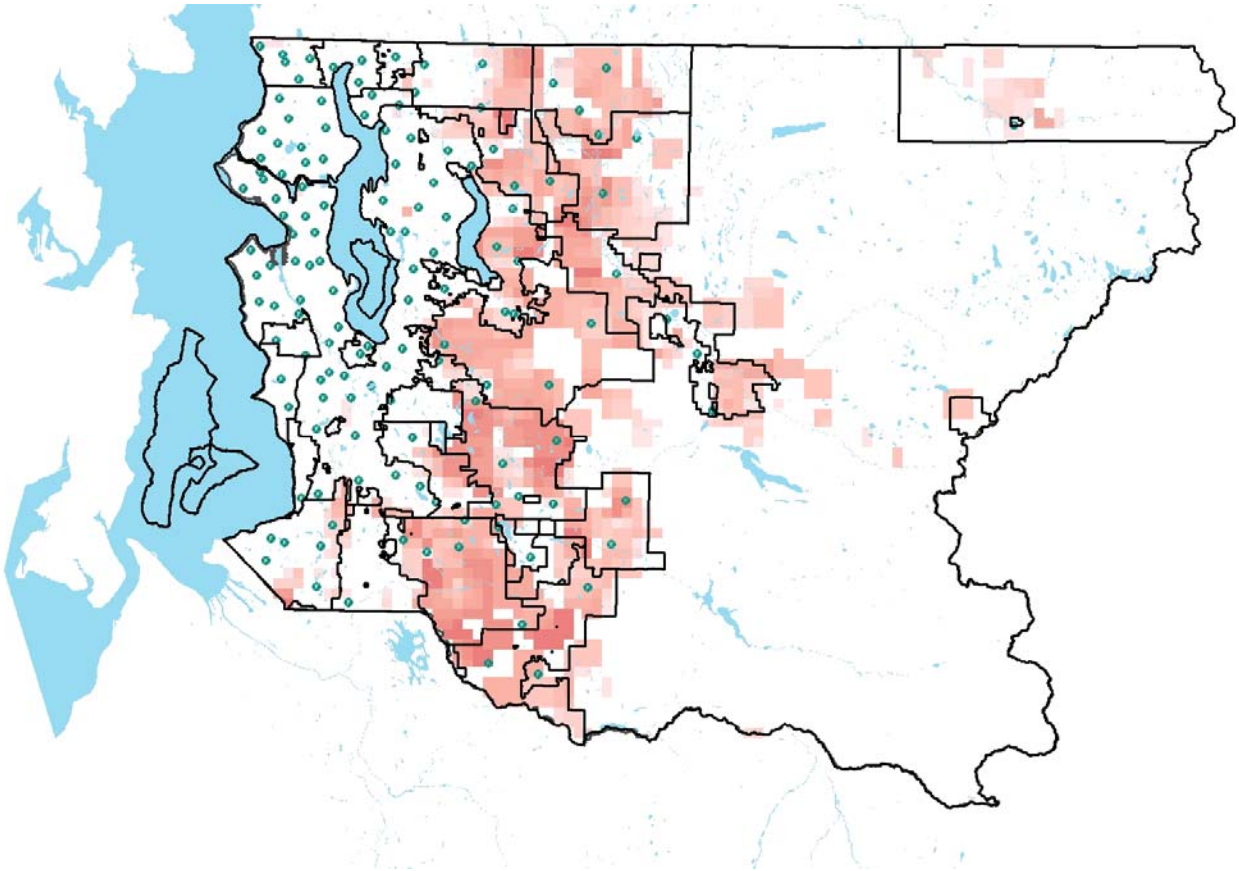
After validation, this tool is ready to be used to analyze risk in the intermix area. In general, this can certainly be used to identify geographical areas requiring mitigation and wildfire pre-planning. Map 10 is the final risk map with an overlay of both fire districts and fire stations. Most counties are currently modeling wildfire intermix risk in order to produce a Hazard Identification and Vulnerability Analysis (HIVA) as required by law. This methodology is quick and could be useful for that purpose.

However, the model could be improved. In order to improve this tool, better resolution and accuracy will be required. Future resources could include:

1. King County has LIDAR data for vegetation coverage. This is probably the data being produced by the Remote Sensing Lab at the University of Washington. This data could used to code the fuel, using the local fire management expertise to identify the fuel type and fire regimes.
2. Contour lines at 40 ft intervals are available. This could be used to improve the slope and aspect information.
3. A building layer could be used and density could be calculated from that layer rather than using the census blocks.
4. Lightning strike data should be available from the Northwest Coordinating Center in Portland, Oregon.

These changes would make the model more accurate and could help responsible agencies identify mitigation and preplanning needs, work with citizens on defensible spaces, and track fuel reduction and mitigation efforts. As a model in a GIS system, this tool is interactive and could be more powerful in that regard. Programming a useful interface with preset functions could make this a dynamic tool for fire departments. Additionally, by including fuel data in the tables, "Behave" could be used along with GIS simply by adding the fire weather data. Behave could then be run and will produce shape files. This would enable the product to be used on fire operations or for scenario planning. An identical set-up could be used for Hazardous Material, using Aloha (modeler) and Cameo chemical tables. A third part, including fire preplanning and evacuation information, would complete the GIS suite.

Map 10 Risk Map with Fire Stations and Fire Districts



Attachment 10

CRITICAL FACILITIES

HOSPITALS and RETIREMENT & BOARDING HOME FACILITIES

HOSPITALS

- **Group Health Hospital**
  2700 – 152 Avenue NE
  Dale Grandlic – Facilities Supervisor
  (425) 883-5104
  (206) 993-5770 - Pager

RETIREMENT & BOARDING HOME FACILITIES

- **Cascade Plaza Retirement Center**
  7950 Willows Road NE
  106 Patient Beds
  Liz McPherson - Administrator
  (425) 885-4157
  (360) 794-5920 - Home

- **Cascade Vista Convalescent Center**
  7900 Willows Road NE
  139 Patient Beds
  Pearl Barnes - Owner
  (425) 885-0808
  (425) 881-6606 – Home

- **Chateau Marymoor**
  4585 West Lake Sammamish Pkwy NE
  Brian Griffith – Maintenance Supervisor
  (425) 556-9398

- **Emerald Heights**
  10901 – 176 Circle NE
  284 Units
  Choate Bud – Director of Facilities
  (425) 556-8180 – Facilities Dept.
  (425) 556-8286 – Director of Facilities

- **Peter's Creek Retirement Center**
  14431 Redmond Way
  30 Units
  Michael Schaedig – Executive Director
  (425) 869-2273
  (206) 617-3156 – Cell

- **Redmond Retirement Manor**
  7480 West Lake Sammamish Pkwy NE
  50 Patient Beds
  Mary Ann Peterson – Director
  Paul Cartwright – Maintenance Sup.
  (425) 881-2060

- **Sterling Park Living Center**
  Kingswood at Sterling Park
  Sterling Park Assisted Living
  2956 – 152 Avenue NE
  (425) 883-0495

- **Pine Villa Guest Home**
  Stillwater – Mental Health NW
  8705 – 166 Avenue NE
  22 Units
  (425) 869-8659

CRITICAL FACILITIES

RESIDENTIAL ELDER CARE FACILITIES

- **Marion Christianson**
  14416 NE 65 Street

- **Janet Hansen**
  15333 NE 66 Court

- **Titus Hornoiu**
  3411 – 180 Avenue NE

- **Gwoying Hsieh**
  9003 – 171 Avenue NE

- **Dorina Ilisan**
  2604 – 136 Avenue NE

- **Laura Johnson**
  7509 – 143 Avenue NE

- **Iraj Mostarshed**
  10334 – 184 Avenue NE

- **Lyudmila Mukhin**
  10910 – 184 Avenue NE

- **Librado Pineda**
  17815 NE 108 Way NE

- **Librado Pineda**
  4316 – 171 Avenue NE

- **Veronica Sarbulescu**
  2316 – 180 Place NE

- **Sylvania Elderly Care**
  3322 – 179 Avenue NE
  (425) 869-7598

- **Eileen Tefft**
  14012 NE 71 Street

- **Lourdes Verzosa**
  8316 – 133 Avenue NE

- **Pavel Viseoan**
  7738 – 151 Avenue NE

Attachment 10

CRITICAL FACILITIES

PUBLIC SCHOOLS

- **Audubon Elementary School**
  3045 - 180 Avenue NE
  Cheryl Chikalla - Principal
  (425) 881-9575
  Approximate Enrollment: 470 Students

- **Einstein Elementary School**
  18025 NE 116 Street
  Paul Luczak – Principal
  (425) 558-7973
  Approximate Enrollment: 570 Students

- **Family Learning Center (Home School)**
  2315 – 173 Avenue NE
  Jane Andrew – Principal
  (425) 702-3331
  Approximate Enrollment: 220 Students

- **Mann Elementary School**
  17001 NE 104 Street
  Mary A. Nelson – Principal
  (425) 881-9696
  Approximate Enrollment: 437 Students

- **Redmond Elementary School**
  16800 NE 80 Street
  Stephen Bryant – Principal
  (425) 702-3419
  Approximate Enrollment: 303 Students

- **Rockwell Elementary School**
  11125 - 162 Avenue NE
  John Nesbitt – Principal
  (425) 881-0139
  Approximate Enrollment: 550 Students

- **Rush Elementary School**
  6101 - 152 Avenue NE
  Justin Blasko – Principal
  (425) 881-6047
  Approximate Enrollment: 500 Students

- **Redmond Jr. High School**
  10055 - 166 Avenue NE
  Alicia Brown – Principal
  (425) 885-7034
  Approximate Enrollment: 900 Students

- **Rose Hill Jr. High School**
  Stella Schola Jr. High School
  13505 NE 75 Street
  Ron Mahan – Principal
  (425) 881-2079
  Approximate Enrollment: 780 Students

- **Redmond High School**
  International Community High School
  Odyessy Jr. High School
  17272 NE 104 Street
  Brian Hunter – Principal
  (425) 881-4330
  Approximate Enrollment: 1310 Students

Attachment 10

CRITICAL FACILITIES

PRIVATE SCHOOLS, PRE-SCHOOLS, and DAYCARE CENTERS

PRIVATE SCHOOLS

- **Cascadia Montessori School**
  4239 – 162 Ave NE
  425-881-2885

- **Faith Lutheran School**
  9041 – 166 Ave NE
  425-882-2778

- **Little Folks Christian School**
  16601 NE 95 Street
  425-885-9364
  Total Capacity: 100 Children

- **Maktab Tarighe Oveyssi Shahmaghsoudi**
  17431 NE 28 Street
  425-556-9439

- **Marymoor Montessori School**
  4244 Bell-Red Road
  425-885-3016

- **Redmond Montessori**
  5412 – 157 Drive NE
  425-556-5486

- **Sammamish Montessori School**
  7655 – 178 Place NE
  425-883-3271
  Total Capacity: 60 Children

PRE-SCHOOLS & DAYCARE CENTERS

- **Best Beginnings Pre-School**
  11526 – 162 Avenue NE
  425-881-3468

- **Child Time Children's Center**
  4306 – 156 Avenue NE
  425-869-3949
  Total Capacity: 93 Children

- **Children's World Learning Center**
  16851 Redmond Way
  425-881-0742
  Total Capacity: 112 Children

- **Cisco Kids**
  7120 – 185 Avenue NE
  425-869-1379
  Total Capacity: 17 Children

- **Community Children's Center**
  8323 – 166 Avenue NE
  425-822-0794
  Total Capacity: 15 Children

- **Grasslawn Children's Center**
  7355 – 148 Avenue NE
  425-881-7177
  Total Capacity: 41 Children

- **Kindercare Learning Center**
  15202 Redmond Way
  425-885-2377
  Total Capacity: 145 Children

- **Kindercare Learning Center**
  6534 East Lake Sammamish Pkwy NE
  425-869-2084
  Total Capacity: 128 Children

- **Kindercare Learning Center**
  2060 – 152 Avenue NE
  425-644-4686
  Total Capacity: 150 Children

- **La Petite Academy**
  8675 – 161 Avenue NE
  425-867-1998
  Total Capacity: 150 Children

- **Overlake Christian Pre-School**
  9900 Willows Road
  425-895-5938

PRE-SCHOOLS & DAYCARE CENTERS
(cont.)

- **Redmond Cooperative Pre-School**
  16540 NE 80 Street
  425-885-2888

- **Redmond Toddler Group**
  7917 – 159 Place NE
  425-869-5605

- **Small Dimensions**
  8460 – 160 Avenue NE
  425-869-0270
  Total Capacity: 92 Children

- **Teddy Bear Creek Learning Center**
  17950 Union Hill Road
  425-883-9802
  Total Capacity: 85 Children

- **YWCA Family Village Child Care**
  16601 NE 80 Street
  425-556-1350
  Total Capacity: 40 Children

CRITICAL FACILITIES

CITY OF REDMOND, GOVERNMENT OWNED & LEASED BUILDINGS

- **Redmond Municipal Campus**

  City Hall
  15670 NE 85 Street

  Public Safety Building
  8701 – 160 Avenue NE

  Senior Center
  8703 – 160 Avenue NE

  City Hall Modular (Fire Prevention)
  15670 NE 85 Street

  Old Redmond Library Building
  15810 NE 85 Street

  Northeast District Court (KC)
  8601 – 160 Avenue NE

  New Redmond Library (KC)
  15990 NE 85 Street

- **City Maintenance & Operations Center**

  Public Works Operations Center
  18080 NE 76 Street

  Street Department Modular
  18080 NE 76 Street

  Decant Building
  18100 NE 76 Street

  Park Operations Center
  18120 NE 76 Street

- **City Annex Building** (Leased)
  15965 NE 85 Street

- **Westpark Building M** (Leased)
  8414 – 154 Avenue NE

- **Sammamish River Business Park**
  (aka the 90th Street Building)
  15501 NE 90 Street

- **Old Redmond Schoolhouse Community Center**
  16600 NE 80 Street

- **Old Redmond Fire House Teen Center**
  16510 NE 79 Street

- **Fire Station 11 (HQ)**
  8450 – 161 Avenue NE

- **Fire Station 12**
  4211 – 148 Avenue NE

- **Fire Station 16**
  6502 – 185 Avenue NE

- **Idylwood House** (Police/Parks & Rec)
  3650 West Lake Sammamish Pkwy

- **City Pump Station**
  15800 Redmond Way

- **Education Hill Water Tower**
  180 Avenue NE @ NE 100th

- **East Hilltop Water Tower**
  6710 – 184 Court NE

- **Sewer Lift Station**
  NE 76 Street @ 178 Place NE

July 2004

City of Redmond

Hazard Mitigation Plan

Document Three:

HAZARD MITIGATION PLAN

HAZARDS MITIGATION PLAN

Table of Contents

EXECUTIVE SUMMARY

The City of Redmond can utilize Hazard Mitigation Strategies to create a sustainable society resilient to natural and manmade hazards. Hazards can result in the disruption of entire communities, persisting long after the causative event itself and exceeding the community's ability to recover unaided. The impacts of natural hazards can, at a minimum, be mitigated or, in some instances, prevented entirely. The City of Redmond is vulnerable to a variety of hazards, including earthquakes, severe winter storms, flooding, landslides, and terrorism. The degree of risk, resulting from the occurrence of one or more of these hazards, is determined by the nature of the hazard and what is vulnerable.

Ground shaking from a major earthquake would likely result in widespread damage to single-family homes and small businesses. Damage to utilities and the transportation infrastructure could also occur. However, earthquakes are only one of the hazards that could threaten the City and its residents. Redmond is home to some of the most recognizable corporate giants in the nation, including Nintendo, AT&T, and Microsoft. These corporations, as well as the Olympic Pipeline, may be vulnerable to terrorist attacks. Hazards can affect Redmond not only at the local level, but the regional level as well. Redmond is highly vulnerable to isolation especially during a regional event. During a regional event, mutual aid agreements and outside assistance may be largely unavailable, leaving the City to care entirely for itself.

This document identifies the Goals and Objectives that provide overall direction for the planning effort and offer mitigation items to reduce risks over the long term. This project began with a Hazard Identification and Vulnerability Analysis (HIVA) that was completed by University of Washington graduate students in June 2001. The purpose of that document was to: (1) Provide a basic level of knowledge and initial analysis of the risks facing the City of Redmond; and (2) Serve as the basis for the City of Redmond to initiate the Mitigation Planning Process and support the City's overall risk reduction effort.

Based on the information contained in the HIVA, additional research, and feedback from the City of Redmond, local business owners, and residents, the team produced a Multi-Hazard Mitigation Plan Proposal for the City of Redmond in March 2002. That document contained a comprehensive set of issues that were identified based on the foreseeable hazards, and the vulnerabilities associated with those hazards.

This document, Hazards Mitigation Plan for the City of Redmond, is the third stage in the Hazard Mitigation Planning Process. As a part of this planning process goals were developed to guild the planning process form information gathered through focus group sessions, one-on-one interviews, literature reviews, and team planning sessions. Based on feedback from the City of Redmond, local business owners, residents, and additional research, Objectives were identified and specific actions items were developed.

All action items generated in this project were designed to achieve these goals and objectives.

Of all the actions identified in this report, ten priority items are summarized below. These top ten action items were selected based on guidance from City leaders, the effectiveness of the strategy at reducing vulnerability, and the comprehensive mitigation achieved by implementation.

1. Develop alternative emergency government operations capabilities outside of high-risk areas

2. Partner with King County, neighboring jurisdictions, and WSDOT to harden transportation routes
3. Strengthen relationships between corporations and vendors, including provisions for emergency operations centers and mutual aid
4. Reduce risk to the Olympic Pipeline and surrounding areas
5. Implement neighborhood-targeted risk reduction programs
6. Design events promoting business continuity
7. Adopt a post-disaster recovery plan for Old Town
8. Retrofit historic district structures
9. Support regional mitigation initiatives
10. Enhance existing GIS capabilities emphasizing hazard analysis

The primary focus of this document is mitigation, which is "any sustained action that reduces or eliminates long-term risk to people and property from natural hazards and their effects." The document focuses on goals and objectives that reduce the level of risk where possible, thereby limiting the need for preparedness. Where mitigation is not feasible or until an acceptable level of mitigation can be achieved, the report offers action items that focus on preparedness and response.

The goals and objectives stated in this document were driven by the visions stated in the City of Redmond Comprehensive Plan, and they are consistent with those statements. The report also includes ways the City can capitalize on the recovery opportunities presented following a disaster.

The City will include these actions in future post disaster recovery efforts resulting in a safer, more resilient community.

INTRODUCTION

Background

The City of Redmond is the sixteenth largest city in Washington State, with a residential population of more than 45,000 people. It encompasses an area of over 16 square miles and is located less than 20 miles east of downtown Seattle at the north end of Lake Sammamish. The City takes pride in its high quality of life with good schools, a healthy economic base, a parks system that provides a variety of recreational opportunities, diverse offerings for shopping and dining, safe neighborhoods, and an emphasis on quality development and protection of the natural environment.

The City is a well-known center of technology and is home to a number of nationally and internationally known high-tech and biomedical companies. Among these are Microsoft, Nintendo, AT&T Wireless, Spacelabs Medical, and Medtronic Physio-Control. Redmond Town Center, a large downtown retail center, offers numerous shops, restaurants, an eight-screen movie theater, special events, and live theatre performances. As Redmond continues to evolve into a thriving City of increasing diversity, it seeks to promote its sense of community through programs designed to celebrate its heritage, enhance its neighborhoods, and preserve its historical and natural treasures. In keeping with the desire to preserve its small town feel and protect the livelihood and safety of its citizens, the City of Redmond has partnered with the University of Washington to create a more disaster-resilient community through the creation of a Hazard Mitigation Plan for the City of Redmond.

Hazard Mitigation Planning has become an increasingly important element in Planning, especially in the Seattle area where natural and human-made hazards threaten the livelihood of all who live in the region. The City of Redmond has experienced a variety of hazard events in the past, such as earthquakes, fires, flooding, landslides, and civil disturbance, which have prompted local government to include Hazard Mitigation Planning in their current initiatives. Hazard Mitigation Planning has become even more important with the recent advent of terrorism, particularly in cities that represent and encompass symbols of economic and cultural posterity.

Past Cooperation Between Redmond and the University of Washington

The City of Redmond has a valuable partnership with the University of Washington. In 1999 the City partnered with the University of Washington's Master of Urban Planning Program. Through a spring studio course, students created a livable City plan to guide the future of Downtown Redmond. Under the direction of Instructor Bob Freitag, a second studio focused on creating a Hazard Identification and Vulnerability Analysis (HIVA) for the City of Redmond in 2001. The HIVA identified risk as it relates to hazard and vulnerability. The purpose of the HIVA was to provide a basic level of knowledge and analysis of the hazards posing a threat to the City of Redmond and to serve as a basis for the City of Redmond to initiate a Hazard Mitigation Plan.

Hazard Mitigation Planning Process

During the Winter of 2002, the City of Redmond and University of Washington Professors Bob Freitag and Frank Westerlund teamed up to create the Hazard Mitigation Plan for the City of Redmond. A Hazard Mitigation Plan is an attempt to identify vulnerabilities and reduce or eliminate the impacts of hazards on cities by mitigating those vulnerabilities. The University of Washington students working together with the City of Redmond crafted the following plan in an attempt to guide Redmond to a more sustainable and disaster-resistant community.

HIVA

The groundwork for the Hazard Mitigation Plan began with the Spring 2001 HIVA (as described above). This document identifies risk and vulnerability within the City of Redmond. Risk was defined as a function of the hazard and the vulnerability. After defining risk, the studio identified the vulnerabilities of the City of Redmond to a variety of hazards including earthquakes, flooding, winter storms, terrorism, civil disturbance, and wildland interface fires. The HIVA also identifies vulnerabilities to these hazards. These vulnerabilities include the residents of Redmond, small businesses, major corporations, lifelines, City infrastructure, and the historic district. Through the identification of the risk and vulnerabilities in the HIVA, students began the development of the Hazard Mitigation Plan for the City of Redmond in January 2002.

Public Process

Public process was an important step in the creation of the Hazards Mitigation Plan. From the first stage of issue identification, City staff were consulted and interviewed for fact finding and checking. An open meeting in the City Council Chambers was held on March 5, 2002. Goals, Objectives and Action Items were presented to City staff and other attendees for response, feedback and input. In April of 2002, a meeting was held with City Planning staff for feedback. On May 27, 2002, a second open public meeting was held to gain feedback and to elicit input from community stakeholders. Other efforts to gain public input included the use of the City of Redmond's planning documents such as the Comprehensive Plan, a document that developed through public participation.

Scenario Development

Scenarios were developed to help identify vulnerabilities, clarify goals and objectives, formulate specific action items, support discussions of benefit to cost relationships and most importantly, facilitate public participation. Three scenarios were developed to address the following situations.

Hazard Scenario 1: Large-Scale Regional Event

a. This event would impact the entire Puget Sound region and could be a shallow Seattle Fault earthquake.

Hazard Scenario 2: Small-Scale Localized Event

a. This event would more likely be scattered, smaller events impacting Redmond, such as a landslide that washes out a road and results in short-term isolation.

Hazard Scenario 3: Catastrophic Localized Event

a. This event is one that would cause extreme damage in Redmond, such as a pipeline explosion or a terrorist event.

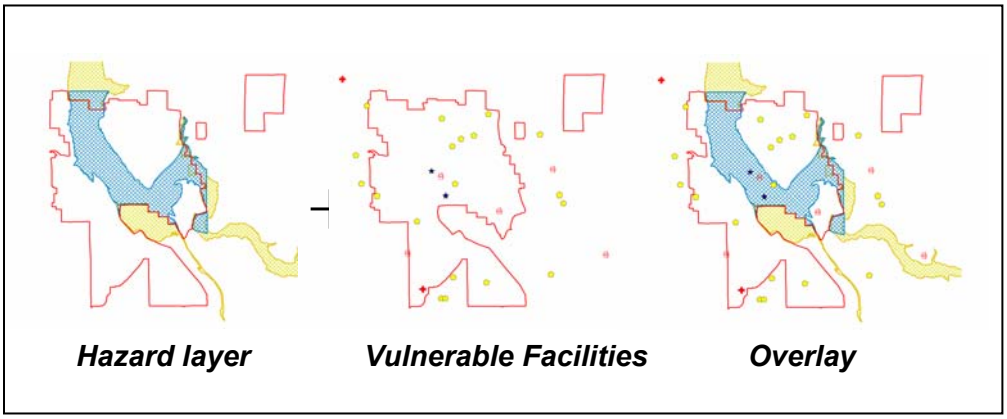
Geographic Information System Analysis

Project research included analysis of Geographic Information System (GIS) and spatial data layers to assess the exposure and vulnerability of Redmond's neighborhoods and infrastructure to hazard events. GIS is a computer system that is able to collect, integrate, manipulate, analyze, and present spatial data. The GIS programs ArcView and ArcInfo, aerial photography,

and spatial data derived from various sources formed the basis for the spatial analysis and mapping.

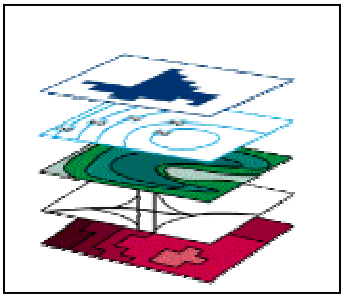
The methodology we used for the spatial analysis and for creating maps is based on the definition of 'risk.' Risk can be defined as a function of a hazard and vulnerability. A hazard without vulnerability, or vulnerability without a hazard, does not result in risk. An overlay of a hazard layer with a vulnerability layer shows which vulnerable structures are located in risk areas (Figure 1).

Figure 1. Hazard + Vulnerability = Risk



The hazard layers used in the project have combined a City of Redmond hazard layer with a King County hazard layer. To keep the two data sources distinguishable, these two different hazard layers are separated by color or by fill pattern, depending on the background colors. Maps and spatial data layers are overlaid in GIS to produce a pattern of distribution on the landscape (Figure 2); analysis of composite layers can indicate where hazard layers present a risk to vulnerable structures.

Figure 2. Example of overlays



Capabilities and Limitations of GIS Analysis

By combining the City's and King County's hazard layers, overlays with hazard layers on top of the available vulnerability layers could be done. Subsequently, these overlays and the aerial photography are used to make rough estimates on the numbers of structures in hazardous areas.

Unfortunately, as with many developing tools, a few limitations are noticed. First of all, the hazard layers are not subdivided in high- medium- and low-risk hazard areas. Besides, important vulnerability layers (i.e., structure footprints and parcel data) and metadata are missing, and other data is over ten years old. Therefore, the spatial analysis and the mapping are not very reliable.

An action item offered in this plan is that the City of Redmond enhance GIS development, emphasizing hazard layers with parcel and structure data, more hazard research, and development of HAZUS data-needs to make spatial analysis more reliable in the future.

How This Document Works

The following two sections present the scenarios that guided development of the Plan. Goals were developed from these scenarios and are described. Objectives are listed under each respective goal and action items are listed by objective.

SCENARIOS

Three hazard scenarios guided the development of the Plan. These three hazard scenarios are outlined below and encompass the range of hazard events that Redmond would typically experience. They were widely used during the public process and help to put a "face" on the risks facing the City.

Hazard Scenario 1: Large-Scale Regional Event

Certain types of hazard events present a threat not only to the City of Redmond, but the entire Puget Sound region. A region-wide terrorist incident, extremely severe winter storm, or a regional earthquake could trigger a large-scale, regional hazard event. The most probable large-scale, regional event would be an earthquake. Based on probabilities generated by the USGS, a regional earthquake scenario, with a 10% probability of occurrence in the next 50 years, would involve ground accelerations between .25 and .35%g. Ground shaking has significant impacts not only on the softer soils within in the City of Redmond as assumed in Scenario 2, but throughout the greater metropolitan area.

Access to Redmond could be cut off by the potential loss of major lifelines such as Highway 520, and Interstate 405. Damage to lifelines and transportation infrastructure could also result in community/neighborhood isolation. Community isolation will be particularly dangerous in that emergency services may be largely unavailable to local residents and businesses. Local residents may prove to be the City's most valuable resource during a large-scale regional event where mutual aid agreements and outside support may be unavailable. The City could make some efforts to increase safety and disaster resilience in local communities.

- Train local residents to be self-sufficient for the initial 72 hours of a disaster.
- Promote citizen and small business involvement in preparedness and mitigation initiatives to encourage a locally driven, community-based effort.

The capacity for local emergency services to respond to a large-scale regional event is questionable. It is likely that this type of event would exceed the capabilities of local emergency services, resulting in increased risk to local residents, businesses, and the economy. The City should focus on developing redundancy in local emergency response resources and personnel to limit the need for, and reliance upon, mutual aid agreements and outside assistance during the initial stages of a disaster.
Additionally, it is reasonable to assume that Redmond may experience a fair amount of structural and non-structural damage during a large-scale regional event. In order to facilitate recovery efforts, it is essential that local residents and business owners submit damage reports to local authorities as soon as possible. Rapid disclosure of damage reports could result in additional financial support from state and federal agencies, increasing the community's ability to recover. Therefore, the City should educate its residents about how and where to submit damage reports, as well as provide a user-friendly means of doing so.

Hazard Scenario 2: Widespread Localized Events

Widespread localized events represent points of disruption within the City of Redmond or the region. These include site-specific events such as landslides or storm water drainage failure. Events such as stream flooding or wildfire may occur across a larger area such as a neighborhood or stream basin. Periods of heavy rain or winter storm events can trigger many small-scale flooding and landslide events within the region.

Each of these events is too small to directly affect the City or region, but each may represent significant disruption to a particular business district or neighborhood. A number of small events may add up to a large impact on the City's residents and economy.

A typical example of these widespread localized events could result from several days of heavy rain.

- Swollen streams produce localized flooding events at road culverts along Bear Creek or other smaller drainages in Redmond. Access through many key roads such as SR 202 (Redmond-Fall City Road) is bottlenecked or lost due to surface flooding.
- The volume of water exceeds the storage capacity of wetlands and storm drainages, particularly those drainages near central Redmond that backwater from the Sammamish River and in older neighborhoods that have not been retrofitted for adequate storm water capacity. Traffic is congested through the City Center and other neighborhoods due to water impounded on the streets.
- Increased drainage destabilizes slopes. Isolated landslides occur on certain vulnerable roads. Traffic is further diverted and congested, cutting off key economic centers and corporations in Redmond from their vendors and customers. A slope fails and blocks a stream channel at its base, diverting its flow through the local neighborhood and flooding homes.
- A small slide and falling trees knock down overhead lines, leaving neighborhood residents and home-based businesses without power, phone, or Internet access for hours. The fallen trees and the toe of the slide may block their egress routes. Emergency services have difficulty responding to residents in homes that have been damaged by a landslide event because of roadway blockage.

Small-scale events may happen individually, presenting a nuisance that diverts traffic, causes lost power to a neighborhood, or inconveniences a small sector of residents and businesses. On an individual basis, response personnel may address these events efficiently and rapidly. However, the response capabilities of Redmond's utility crews, road crews, and fire and emergency response personnel may be highly compromised by a large number of small, localized hazard events. The number of small incidents brought on by heavy rainfall can be manageable one by one but may reach a critical mass if occurring throughout the City. Communities and businesses, particularly those in neighborhoods or districts that are vulnerable to landslides or flooding or have a main ingress/egress route that is vulnerable, should be prepared for short periods of isolation due to these localized hazard events.

Hazard Scenario 3: Catastrophic Localized Events

Catastrophic localized events contain great adverse impacts in a specific geographic location within Redmond. Examples of these specific locations are an area clustered with corporations or an area housing several neighborhoods and associated business districts. These events impact geographic-specific locations and may also cause regional impacts. Catastrophic localized events typically do not occur frequently; however, their impacts are great.

Examples of a catastrophic, localized event include a rupture in the Olympic Pipeline or a terrorist attack. A rupture in the Olympic Pipeline may affect neighborhoods located in proximity to the pipeline. In addition, the attendant disruption of service may cause regional implications. If a large corporation becomes victim to a terrorist attack, adverse local impacts may disrupt business, impact employees, and disable transportation. Given Redmond's large corporation contributions to the regional and national economies, regional and national impacts will result.

The City's capability to reduce the impacts of a catastrophic, localized event is pertinent to maintaining the local economic sector as well as regional and national economies. The City should focus Hazard Planning on business continuity. Business continuity planning can consist of several elements.

- Encouraging clusters of corporations or neighborhoods to plan for a catastrophic disaster. Additionally, the clusters of corporations or neighborhoods should plan for a swift and effective response and recovery period through development of partnerships.
- Identify alternate transportation routes for product and delivery distribution for large corporations and small business districts.
- Develop mutual aid agreements with King County and adjacent municipalities to identify sharing of response and recovery resources.
- Develop a strategy to help neighborhoods, corporation clusters, and business districts to continue normal operations.

Catastrophic localized events do not only impact the City but also consist of regional and even national implications. Partnerships and continuity planning will help reduce the impacts to these types of event as well as help maintain a sense of normalcy post-disaster.

GOALS

Goal 1: Increase Community Resiliency to Large-Scale Regional Events

A large-scale regional event would likely render mutual aid agreements useless, thereby complicating the City of Redmond's emergency response capacity. Local residents could be initially isolated from emergency services.

Overview

Isolated Populations

Following a major disaster, first responders who provide fire and medical services will not be able to meet the demand for these services. Factors such as number of victims, communication failures, and road blockages will prevent people from accessing emergency services they have come to expect at a moment's notice through 911. People will have to rely on each other for help in order to meet their immediate life saving and life sustaining needs.

Emergency Response Capacity

The City of Redmond Office of Emergency Management may have to shoulder most of the responsibility in a major disaster if King County resources are in short supply. The City's OEM may be incapable of handling a high volume of calls and a wide variety of simultaneous emergencies (Source: 02/19/02 meeting with Bob Lovett, Redmond Fire Department). One inherent problem with emergency situations is the unavoidable threat to first responders. Firefighters, police officers, and EMTs are all at high risk during a disaster.

- *Medical Response*: Disasters can quickly overwhelm local emergency personnel, hospitals, and local blood banks. Redmond is in a general flight pattern area, and a plane crash could exceed ability to respond. Bio-terrorism would put a great strain on medical response capability. Terrorism (i.e., with dirty bombs) could release large amounts of radiation and could exceed medical response capability (Source: 02/19/02 meeting with Bob Lovett, Redmond Fire Department).
- *Fire Response*: Drought could result in conditions that would increase the risk of fires from combustible vegetation (low shrubs, trees on slopes). This problem is amplified on steeper slopes where fuel loading can occur at the bottom, and fires can travel rapidly from bottom to top. Fires in Redmond would likely be localized, but access to fires on slopes can be difficult. Widespread fires could exceed response capability. There are currently six fire stations in Redmond that are fairly new and/or have been remodeled (Source: 02/19/02 meeting with Bob Lovett, Redmond Fire Department).
- *Communications:* During a disaster, it is essential to have a clear, reliable means of communication between cooperating emergency response groups. The City of Redmond (and King County) is currently using an 800 MHz radio operating system to manage emergency communications in a major disaster. During the Nisqually earthquake in 2001, this same system displayed significant weaknesses. Vulnerability of communication centers, phone lines, and other communication mechanisms could amplify the severity of this issue (Source: 02/19/02 meeting with Bob Lovett, Redmond Fire Department).

Emergency Personnel and Resources

Redmond's population as of April 2001 was 45,256 and as of August 2000, 64,241 people worked in Redmond each day. Increased daytime populations may result in inadequate numbers of response professionals and support facilities to handle expected needs during and following a major disaster (emergency managers, doctors, EMTs, firefighters, police officers, etc.) In a major earthquake, there is the potential for partial loss of fire/EMS emergency response capacity. If a fire station should collapse, trapping two or three fire trucks inside, the City's fire response capacity would be seriously undermined. If transportation routes are down, medical professionals may not be accessible, and the capacity for post-event care (shelters, triage centers, hospital care) could be seriously undermined. Important response centers (i.e., fire stations, police stations, medical facilities, and communication centers) should be redundant and reinforced.

Hazard Scenario

Certain types of hazard events present a threat not only to the City of Redmond but the entire Puget Sound region. A region-wide terrorist incident, extremely severe winter storms, or a regional earthquake could trigger a large-scale, regional hazard event. The most probable large-scale, regional event would be an earthquake. Based on probabilities generated by the USGS, a regional earthquake scenario, with a 10% probability of occurrence in the next 50 years, would involve ground accelerations between .25 and .35%g. Ground shaking has significant impacts not only on the softer soils within the City of Redmond as assumed in Scenario 2, but throughout the greater metropolitan area.

Access to Redmond could be cut off by the potential loss of major lifelines such as Highway 520, and Interstate 405. Damage to lifelines and transportation infrastructure could also result in community/neighborhood isolation. Community isolation would be particularly dangerous in that emergency services may be largely unavailable to local residents and businesses. The City should make efforts to increase safety and disaster resilience in local communities by training local residents to be self-sufficient for the initial 72 hours of a disaster. Local residents may prove to be the most valuable resource the City has during a large-scale regional event where mutual aid agreements and outside support may be unavailable. The City should also promote citizen and small business involvement in preparedness and mitigation initiatives to encourage a locally driven, community-based effort.

The capacity for local emergency services to respond to a large-scale regional event is questionable. It is likely that this type of event would exceed the capabilities of local emergency services, resulting in increased risk to local residents, businesses, and the economy. The City should focus on developing redundancy in local emergency response resources and personnel to limit the need for, and reliance upon, mutual aid agreements and outside assistance during the initial stages of a disaster.

Additionally, it is reasonable to assume that Redmond may experience a fair amount of structural and non-structural damage during a large-scale regional event. In order to facilitate recovery efforts, it is essential that local residents and business owners submit damage reports to local authorities immediately. Rapid disclosure of damage reports could result in additional financial support from state and federal agencies, increasing the community's ability to recover. The City should educate its residents about how and where to submit damage reports as well as provide a user-friendly means of doing so.

OBJECTIVES AND ACTION ITEMS FOR GOAL 1

Objective 1

Develop alternative emergency government operations capabilities outside of high-risk areas.

Discussion

Redmond's Municipal Campus is located in a known hazard zone (refer to Appendix A). Local government operations are highly centralized in this area (please refer to Appendices B and I). The following departments are located within the hazard zone: Redmond City Hall (including Human Resources, Executive Offices, Planning Department, Public Works Administration, Transportation Department, Engineering Department, and Utilities Department); Public Safety Building (including Police Department, Finance Department, and Council Chambers); King County Courthouse; Redmond City Annex (including Parks Administration, Natural Resources Department, and Storm water Department); West Park (including Public Works Construction and Inspection); and the Technology Center (including Information Services). The high degree of centralization of government operations in a hazard zone not only represents a significant threat to the local emergency response system but to the entire City of Redmond and its functions. Loss of one or more of these buildings would have severe impacts on the overall functionality of the City. The centralization of local government operations makes the City vulnerable not only to natural hazards but to acts of terrorism.

Action Items:

1.1 Decentralize local government operations

- The City will attempt to decentralize its local government offices and operations by relocating specific departments to alternative sites throughout the City that are not located in known hazard zones.

1.2 Consider stringent retrofits and protective measures if relocation is not feasible, to ensure that its essential facilities are resilient to multiple types of hazards.

- The resiliency of City facilities should be a top priority in hazards mitigation. The City will utilize the most current design methods to ensure that its facilities are strong enough to withstand a disaster.
- The City will publicize its efforts to decentralize and/or retrofit its facilities as a model to support Redmond's commitment to hazards mitigation.

1.3 Construct an alternative EOC (Emergency Operations Center) outside of the known hazard zone

- The City will investigate the construction of an additional EOC. The site should be fully equipped and ready to implement in the event that the existing EOC is damaged or inoperable.

Objective 2

Strengthen the local emergency response system to limit the need for, and reliance upon, mutual aid agreements and outside assistance during the initial stages of a disaster.

Discussion

The capacity for local emergency services to respond to a large-scale regional event is questionable. It is likely that this type of event would exceed the capabilities of local emergency services, resulting in increased risk to local residents, businesses, and the economy. The City should focus on developing redundancy in local emergency response resources and personnel to limit the need for, and reliance upon, mutual aid agreements and outside assistance during the initial stages of a disaster.

Action Items:

2.1 Identify "weak spots" in the City's emergency response system within the context of mutual aid dependencies. Prioritize these weaknesses and make plans for strengthening them through local initiatives.

- Work with neighboring cities and the county in documenting the current state of resources and supporting regional solutions. (i.e., pre-positioning, staging, protocol).
- Work with neighboring cities and the county in conducting functional assessments of emergency resources and personnel immediately following major disasters to identify regional weaknesses and prioritize areas needing improvement.

2.2 Work with neighboring cities and the county in updating the existing Emergency Response Plan to include guidelines for dealing with inadequate resources/personnel during the initial stages of a disaster.

- Use the data gathered through the report submittals and functional assessment from emergency services organizations to identify weaknesses in the system and develop contingency plans for addressing anticipated inadequacies.
- Train local emergency response professionals in methods for dealing with volunteers and relief workers.

Objective 3

Make full use of current technologies in the development of goal to create safer, more resilient communities.

Discussion

The City of Redmond should focus its efforts on utilizing its existing resources. The City does not have enormous financial capabilities at this time; therefore, it is unreasonable to assume that expensive, short-term programs will be considered. However, the City does possess a number of resources that could be developed and enhanced to include disaster planning as a primary theme. In doing so, the City would be able to focus on gathering hazard information in the short-term with the intent of making long-term financial decisions when the best available

data is obtained. One of the City's best resources is its GIS division. Enhancement of this program would result in planners having the necessary geo-spatial information to make better decisions (Refer to appendices for examples of GIS maps).

Action Items:

3.1 Enhance the City's ability to identify and understand the hazards they face by investing in the development of computer technologies.

- The City will maximize the utility of its existing Geographic Information Systems (GIS) capabilities by including disaster planning as a primary role of the local government's GIS division.
- The City will prioritize and begin to develop the data sets that are necessary to test hazard scenarios and mitigation tools in FEMA's Hazards U.S. (HAZUS) loss estimate modeling program.

3.2 Enhance the City's existing "Disaster Preparedness" website to include a real-time disaster information center to provide important information to, and communicate with, the public during all stages of a disaster.

- The City can utilize the Internet as a communication tool as well as an education tool. The “disaster information center” portion of the website would provide local residents with hourly updates during disaster situations and could provide a means of reporting emergencies when phone lines and cellular phones are inoperable.

Objective 4

Support a region-based focus on mitigation and sustainability through working with neighboring cities and the county in strengthening public education and outreach programs.

Discussion

Data collected immediately following a major regional event, such as an earthquake, can be critical during emergency response and recovery. Some data is perishable and must be collected as soon as possible. They should also establish a mechanism for relaying information from scientific and engineering investigations to emergency managers. Rapid disclosure of damages from local residents could help to ensure that the maximum amount of financial assistance from government organizations is realized. Within a regional context, a mitigation project in Kirkland for instance, will free up personnel and assets to help Redmond in a regional event.

Action Items:

4.1 Increase public awareness and preparedness by developing a series of regionally available public workshops or seminars to educate homeowners and local businesses on earthquake-resilient practices.

- The City, in cooperation with neighboring cities and the county, will address the development of a series of seminars focusing on disaster preparedness, community resiliency, and mitigation, and continue to utilize its local schools as conference centers for hosting these workshops.

- The City, in cooperation with the county, will work to supplement the existing school-based preparedness programs with after-school programs geared toward students' parents. Having the seminars in the evening and encouraging parents to participate would result in safer homes and communities.

4.2 Increase community recovery capabilities by creating a system whereby local residents and businesses can immediately submit damage information to responders and the proper authorities.

- Rapid submittal of damage estimates is essential following a disaster and should be a high priority for local residents. The “disaster information center” (refer to objective 2, action item 2.2) could provide a convenient means of submitting this information digitally.
- The City could consult with the USGS and the National Weather Service to determine how to best approach this type of program. The USGS utilized its web-based capabilities to gather earthquake information from citizens through its Earthquake Hazards Program's “earthquake reporting website.” The National Weather Service radio is becoming an all-hazards service.

Objective 5

Identify and protect critical facilities in the City of Redmond

Discussion

Critical facilities are those that would present a high value/high impact during a potential disaster. Selecting which facilities to deem “critical” is a subjective call that the City has to make. A high value/high impact facility is one that presents the potential of having a major impact on local, regional, or national populations or infrastructure if damaged or destroyed. Facilities or events that host large crowds should also be considered. It is also important to identify controversial facilities such as family planning clinics or those that cater to alternate lifestyles. Facilities such as Jewish, Muslim, and Catholic community centers may also be of concern. The most common critical facilities (i.e., police stations, fire stations, hospitals, etc.) are not the only facilities that play a critical role during and after a disaster (Please refer to Appendix B).

Action Items:

5.1 Re-evaluate the risks and demands to critical facilities in light of a regional event to facilitate prioritizing structural and non-structural retrofits based on vulnerability.

- The City will re-evaluate vulnerability and establish criteria for hardening critical facilities that recognizes the demands inherent in a regional event. As a result of such a re-evaluation, the City will consider the establishment of some critical functions outside of the City.

5.2 Continue hazards mapping efforts and distribute data to local officials, as it develops to enhance incorporation of mitigation into Land Use Planning.

- The City's GIS division should seek to establish and/or strengthen relationships with other jurisdictions, consultants, and academia to ensure that maps are as up-to-date as possible, and that local planners have the best available information.

5.3 Review hazard zones and critical areas in Washington (i.e., wetlands, aquifer recharge areas for potable water, fish and wildlife habitat conservation areas, frequently flooded areas, geologically hazardous areas) and develop draft legislation to restrict building of critical facilities in these areas.

- The City will consider, based on the "Best Available Science" Rule of the Growth Management Act, restricting construction of any critical facility in an area that qualifies as a "critical area" under the GMA.
- Redmond's Comprehensive Plan policies will be amended as needed to support the City's efforts to satisfy GMA requirements related to Critical Areas and the use of "Best Available Science."

5.4 Develop infrastructure development policies that will limit the placement of critical infrastructure facilities in hazard-prone areas or served by vulnerable lifelines.

- The City will focus on developing policies that will require no construction of essential transportation, utilities, and communications facilities be permitted in at-risk areas.
- The City will also consider those important infrastructure facilities that are located outside of the City limits and make efforts to address these complex problems as well.

Objective 6

Support regional efforts to provide financial incentives to encourage local business owners and residents to conduct seismic upgrades in their facilities.

Discussion

There are no governmental financial programs in Washington State to encourage property owners to conduct seismic safety upgrades of their facilities. Many insurance providers now only provide insurance to homes and businesses that have undergone retrofitting or are of a structure type that is considered seismically resilient.

Action Items:

6.1 Provide incentives to policyholders to undertake structural and non-structural seismic retrofits.

- The City, in cooperation with the State Insurance Commissioner, will work to find financial incentives with either insurance companies or federal grant programs.

6.2 Encourage lending institutions to provide low-interest mitigation loans for businesses and homeowners.

- The City, along with the State Insurance Commissioner, should work with insurance companies to find these incentives.

6.3 Allow homeowners to apply a portion of their property tax to retrofit their residence.

- The City will evaluate a program to allow homeowners to apply a percentage of their property tax to seismic retrofitting as a one-time relief or over a specific time period up to a ceiling amount.

Goal 2: Reduce Vulnerability of Single-Family Homes and Home-Based Businesses to a Variety of Hazards

The City of Redmond has a large community of single-family residents. The geology and topography of the City may place residents at risk to a variety of hazards, including earthquakes, landslides, winter storms, wildland fires, and flooding. Home-based small businesses are also vulnerable to the same hazards.

Overview

This issue addresses the vulnerability of single-family homes in Redmond to a variety of natural hazards. Each hazard is discussed separately below. The action items made in this section are meant to enable homeowners to minimize the damage to their homes and handle short-term isolation following a disaster event.

Earthquake Hazard

- Western Washington is earthquake country, and major earthquakes will occur in the future in this region. The degree of physical damage to life and property will depend on the location, magnitude, and intensity of the event.
- Ground shaking is the principle hazard associated with earthquakes. Common secondary hazards include liquefaction, landslides, fires, and damage to lifelines and other infrastructure.
- Structural damage to older homes, non-wood frame brick homes, and newer homes on soft soils may occur during and after severe ground shaking. Non-structural damage can result in personal injury and fires. Older homes located in seismic hazard areas are at risk for both structural and non-structural damage.
- Landslides are a secondary hazard of ground shaking. As described below, there are many areas within the City that are vulnerable to landslide hazards.

Landslides

- Local sensitive area maps and the Redmond Community Development Guide identify areas at risk for landslides based on slope, soil or geologic properties, or hydrology. Landslides may be triggered by heavy rains, drainage problems, land movement and disturbances (particularly on previously disturbed slopes), earthquakes, and flooding events (Please refer to Appendix C).
- Common secondary hazards associated with landslides include broken utility lines, damage to lifelines, property damage, and possible flooding.

- Properties at the top, bottom, or face of steep slopes are particularly vulnerable to landslide events. Areas of particular concern include the slopes along Redmond-Woodinville Road where numerous single-family and multi-family residences are located. Education Hill above Avondale Road also contains a large number of single-family homes (between 75 and 150 homes) on top of the slope as well as a substantial number of multi-family homes (at least 12 eight-unit condominiums) on the slope that are vulnerable to damage from landslides. Damage to properties may occur due to slope failure and direct impact from soils, water, and vegetation.

Flooding Hazard

- Redmond does not contain many areas subject to regular flooding events. Unpredictable flooding would be associated with creeks, wetlands, and storm water infrastructure. Isolated flooding does occur, especially backwater flooding along the Bear Creek near Redmond Way beneath the railroad tracks (Please refer to Appendix D).
- New development can significantly impact hydrology, modifying the pattern of water delivery to creeks, wetlands, and storm water systems. This in turn may modify the occurrence of flooding in Redmond's existing developing communities. The population of Redmond is expected to increase by approximately 17,000 people and 10,000 new homes by 2012. This increase in development and impervious surfaces will increase the rate of flooding especially along Bear Creek. Flooding problems could be compounded if agricultural lands within Redmond are built up.
- Common secondary hazards associated with flooding include landslides and fires.

Winter Storms

- Redmond's topography, with hillsides and valleys, creates microclimates and wind tunnels that can compound the effects of a severe winter storm. A severe storm with high winds or snow can create pockets of isolation for Redmond's residents if residential roads and/or main arterials become impassable.
- Several Redmond neighborhoods, including Rose Hill and Education Hill, could be left powerless and isolated in the event of a severe winter storm as a result of high winds, tree blow down, or heavy snow loads on power lines.

Fire Hazard

- Redmond has a number of areas with steep slopes where fuel loading and fire travel can occur. Fire may be triggered by periods of drought, hazardous material release, or earthquakes. Redmond also has a great deal of combustible vegetation, including low shrubbery and steep wooded slopes.
- Properties at the top, bottom, or face of steep slopes are particularly vulnerable to fires. Fires originating at the base of slopes (where fuel loading can occur) can have rapid upslope movement and be very difficult to access. At-risk areas include Education Hill, particularly above Avondale Road, where homes are typically surrounded by trees and other vegetation, and where as many as 150 homes may be located on steep slopes.

- Common secondary hazards associated with fires include damage to buildings and property, loss of vegetative cover, business interruption, landslides, possible flooding, injury, and loss of life

OBJECTIVES AND ACTION ITEMS FOR GOAL 2

Objective 1

To reduce the vulnerability of single-family homes in high risk neighborhoods to a variety of hazards

Discussion

There are specific neighborhoods within the City of Redmond that are at greater risk to damage and isolation from a hazard event than others. Particularly, neighborhoods of Education Hill above Avondale Road are vulnerable to landslides, isolation from winter storms, and damage from fire. As many as 150 homes are located on slopes above Avondale Road that have been identified on local hazard maps as landslide prone areas. Additionally, homes on Education Hill were built in the late 1960's through the mid to late 1970's, prior to the seismic building code standards. It is questionable as to whether these homes are tied to their foundations, making them vulnerable to damage from ground shaking. Other areas of concern include the downtown Redmond area, where single-family homes are low in number but generally built in the early 1960's, again prior to seismic building code standards. Downtown Redmond contains large numbers of relatively new multi-family units. While these units are built to today's code, they are located on soft, alluvial soils, making these homes vulnerable to damage from ground shaking.

Ground shaking is a secondary effect of earthquakes. Ground shaking is magnified on areas of soft soils such as those found in the seismic hazard areas of Redmond. Older homes and homes that are not tied to their foundations are particularly vulnerable to damage caused by ground shaking. The Project Impact Home Retrofit Program began in Redmond in 1997. The program was designed to assist homeowners in seismic strengthening and retrofitting their homes. On the City of Redmond home page there are plans and information about the program. Unfortunately few people have taken advantage of the program.

Landslides are the release of rock, soil, and other debris and its subsequent movement down a slope or hillside. Landslides are generally caused by a variety of factors, including geology, gravity, weather, groundwater, and human activity. Ground shaking during an earthquake is also a major trigger for landslides. The largest areas vulnerable to landslides in Redmond include the roads above Lake Sammamish, north of Redmond-Woodinville Road, and along the eastern slopes of Avondale Road. Residents on, above, or below a slope are vulnerable to loss or damage to lives, home, or property. Residents also face short-term isolation if a landslide were to wash out a road.

Destructive winter storms come in many variations and combinations of wind, ice, rain, and snow. Nearly all destructive winter storms occur in the months between November through April when the jet stream is over the west coast, and Pacific low-pressure systems are more frequent (HIVA). Any winter storm can bring high, destructive winds, heavy rain, and/or snow. The entire City of Redmond is vulnerable to winter storms and damage caused by heavy snow load or high winds. At particular vulnerability to high winds are the neighborhoods of Rose Hill and Education Hill. These neighborhoods are generally lower density, where trees and overhead power lines surround homes. The residents of these communities are vulnerable to power outages and isolation during a severe winter storm event. In most instances there will be

ample severe winter storm warnings given by local weather forecasters and the National Weather Service to allow residents to prepare for an approaching event.

A wildland fire is any instance of uncontrolled burning in grasslands, brush, or woodlands. The urban/wildland interface is the area in which houses and non-residential structures, businesses, public buildings, and utility stations encroach on undeveloped forested lands. Under normal weather and precipitation conditions, the City of Redmond faces low risk of wildland interface fires. During non-normal weather conditions, such as periods of drought and extreme heat, the older neighborhoods on Education Hill and Rose Hill where single-family homes are typically surrounded by trees and other vegetation may be vulnerable to damage from wildland fires.

Action Items:

1.1 Implement neighborhood-based risk reduction programs

Landslides

- Educate homeowners regarding steep slope issues and how to minimize potential for landslides.
  - Topics could include the hazards of dumping fill and debris at the head of a steep slope, erosion control landscaping, and storm water drainage problems.
  - This could be addressed and coordinated by the Public Works Departments.
  - Earthquakes and Ground Shaking
- Promote technical assistance information programs, such as the Project Impact Home Retrofit Program, for homeowners addressing items such as seismic strengthening of homes and non-structural retrofitting.
  - To promote and help education of homeowners, the City could hire an intern from a local high school to canvas at-risk homes and neighborhoods with information regarding the Home Retrofit Program. The City and the Building Department would prepare the information to distribute to homeowners.
  - Libraries, insurance companies, and realtors can also be used as a means to provide information.
  - Availability of private sponsors and organizations should also be investigated to provide motivation and encourage the availability of a tool lending library that gives approximate numbers and costs of certain types of retrofitting.
  - The Project Impact training should include non-structural retrofit training as well as information for structural retrofits.
- Provide financial incentives for retrofitting for neighborhoods at highest risk.
  - Consider applying for home and home-based business retrofitting assistance through the Hazard Mitigation Grant Program (refer to Historical and Cultural Resource section).

Winter Storms

- Host public education workshops for single-family homeowners regarding vulnerabilities to winter storms.

- Issues to discuss could include tree management and how residents handle short-term isolation, such as creation and maintenance of an isolation kit with food and water for 72 hours.

Wildland Interface Fires

- Implement public fire safety programs that disseminate fire safety information to the public, especially in times of increased vulnerability.
  - Efforts can address types of combustible roof coverings, fire safe construction techniques for fire hazard areas, and the importance of clearing brush from around homes.
  - The City and Fire Department can coordinate programs like this.
  - Information should be provided to those homes located in isolated fire hazard areas in Redmond and available at the Fire Department for interested individuals in times of increased vulnerability and drought conditions.
- Encourage fire resistant landscaping techniques within the City of Redmond.
  - The City, in coordination with the Fire Department, should hold forums on fire resistant planting and encourage the development of defensible space around homes.

Objective 2

To reduce the vulnerability of single-family homes located on, above, or below steep slopes to damage from landslides.

Discussion

(Please see discussion for landslides under Objective 1 above.)

Action Items:

2.1 Restore stability of degraded slopes through re-vegetation and slope stabilization efforts.

- Public Works can identify and lead restoration of unstable slopes that threaten single-family homes.
- In hazardous situations (when landslide risk is high on certain slopes after heavy rain or in the aftermath of a large earthquake), consider relocation.
- Apply for Hazard Mitigation Assistance Grant funds.

Objective 3

To reduce the vulnerability of single-family homes located in flood hazard areas to damage from isolated flooding.

Discussion

There are three types of flooding that can occur in the City of Redmond: along the Sammamish River, along streams, and surface water flooding. While flooding does pose a risk in Redmond,

the risk is minimized due to stream and river re-channeling. Most flooding would occur along Bear Creek and would most likely be nuisance with low severity affecting downtown businesses and residential areas. Businesses would be affected by short-term interruptions, but there would be no structural damage. All flooding would be preceded by ample warning time. It requires a severe weather event and substantial rain to produce a flood condition, allowing time for homeowners to prepare for the event.

Action Items:

3.1 The city will apply the new International Building Codes requiring flood-proofed homes in the floodplain and regulations specifying no-fill floodplain, zero-rise floodway analysis, and vegetation retention standards throughout Bear Creek. These regulations will be expanded and applied in all flood-prone areas of Redmond.

Objective 4

Increase safety and disaster resilience in Redmond communities by training local residents to be self-sufficient for the initial 72 hours of a disaster.

Discussion

All disaster events that occur can leave residents isolated in the days immediately following the disaster. Access to Redmond could be cut off by the potential loss of major lifelines such as Highway 520 and Interstate 405. Community isolation will be particularly dangerous in that emergency services may be largely unavailable to local residents and businesses. The City should make efforts to increase safety and disaster resilience in local communities by training local residents to be self-sufficient for the initial 72 hours of a disaster. Local residents may prove to be the most valuable resource the City has during a large-scale regional event where mutual aid agreements and outside support may be unavailable.

Action Items:

4.1 Develop partnerships with FEMA and local organizations to promote disaster preparedness and emergency planning strategies.

- FEMA CFP (Community and Family Preparedness) Program
- SDART (Seattle Disaster Aid & Response Teams)

4.2 Supplement communities' response capability after a disaster by recruiting civilians to be trained as neighborhood, business, and government teams that, in essence, will be auxiliary responders.

- CERT (Community Emergency Response Teams)
- SPAN (Strengthening Preparedness Among Neighbors)

Objective 5

Develop Community Disaster Preparedness Plans tailored to each specific Redmond community, promoting citizen and small business involvement to encourage a locally driven, community-based effort.

Discussion

Each individual community in Redmond will face unique challenges in any large-scale hazard event. Certain communities may be subject to greater risks than others. For example, those communities located within the vicinity of the Olympic Pipeline would be at much greater risk in the event of a pipeline leak or rupture than those located further from the pipeline. Also, damages to transportation infrastructure will likely result in limited access to certain communities, while others remain fully accessible. Therefore, it is important that each individual community understands its own unique vulnerabilities and makes efforts to address them. Community Disaster Preparedness Plans would be a valuable means of identifying community-specific vulnerabilities and established preparedness and/or mitigation strategies that would result in an increased level of community safety.

Action Items:

5.1 Develop partnerships with FEMA and local organizations to promote disaster preparedness and emergency planning strategies.

- Consider Wingspread Principles as a tool for guiding community-based disaster preparedness efforts:
  - Sustainability
  - Planning and Incentives
  - Partnerships
  - Locally-Driven Process

5.2 Establish a Local Steering Committee to assist in the development of the program. The committee could hold monthly meetings to monitor the progress of individual neighborhoods, identify shortcomings, and determine future goals.

- Encourage community organizations and their leaders to establish a committee to monitor preparedness and mitigation efforts within the community.
- Hold regular meetings to discuss issues and assess existing needs. Invite public officials, technical experts, business owners, and academics to attend meetings to provide insight and assistance.

Goal 3: Reduce Vulnerability of Small Businesses

Small businesses are an important segment of Redmond's economy. They not only provide goods and services to the public, they also support the corporations that call Redmond home. They are a major component of Redmond's economy and are vulnerable to a variety of disasters, with most not having the ability to recover from significant events.

Overview

This issue addresses the vulnerability of individual small businesses located within the City of Redmond. Natural hazards that affect small businesses in Redmond include earthquakes, flooding, winter storms, fire, and landslides. There are a number of things that small business

owners within the City of Redmond can do to decrease their vulnerability to a variety of natural and manmade hazards.

Small Business Vulnerability

Of the 4,500 businesses in Redmond, 75% are small businesses that employ fifty or fewer people. In 1997, Redmond's retail sector generated $407 million in taxable retail sales. Small business operations are vulnerable to a variety of hazards including secondary effects such as loss of power and disability of transportation infrastructure (Source: 2/4/02 meeting with Mayor Ives, Redmond demographic information, and Redmond Chamber of Commerce). Some of these businesses are located in single-family homes throughout Redmond. Single-family home vulnerability is covered in the previous section.

Old Town/City Center Vulnerability

Old Town City Center contains many small businesses housed in designated historic landmarks. These masonry buildings were constructed between 1900 and 1910 and, because of their location in Redmond's seismic hazard area, they are vulnerable to significant damage in the event of an earthquake (Source: 2/15/02 meeting with Diana Broadie, Planner, Historic Preservation Program, and Redmond's seismic hazard area map).

Small Business Preparedness

Few businesses have developed business resumption plans. Financial costs incurred from a hazard event may place significant deterrents to recovery. Additionally, few businesses have hazard mitigation plans, and City sponsored events encouraging small businesses to adopt recovery and mitigation plans received low participation (Source: 2/04/02 meeting with Robert Schneider, Redmond Emergency Preparedness Coordinator and 2/15/02 meeting with Ed Billington, Operations Commander, Redmond Police Department).

OBJECTIVES AND ACTION ITEMS FOR GOAL 3

Objective 1

To ensure survivability and expedite business resumption following a disaster

Discussion

Estimates indicate that 43% of small businesses never reopen after a local disaster (Institute for Business and Home Safety). Small businesses are a major component of both Redmond's economy and the cities character. The small businesses of Redmond are not only important retail businesses for Redmond's residents they are also important out-sources for corporations in Redmond. The following action items provide a means for Redmond's small businesses to ensure survivability, minimize losses and resume business operations as quickly as possible following a disaster.

Action Items:

1.1 Design events to promote business continuity

- The Chamber of Commerce and small business organizations, working with other eastside cities to share costs of work and address inter-jurisdictional Issues, could coordinate this.
- Specific educational topics should include preparation for short-term business disruptions and contingency plans for emergency situations.
- Relevant information includes structural improvements (redundancy in communication systems and generators) as well as improving functional connection and recovery between businesses that rely heavily upon one another for function.

1.2 Facilitate partnerships and sharing of resources between small businesses and large corporations (refer to Vulnerability of Corporations, action item 1.4)

- Large corporations should be encouraged to provide resources to their vendors, back-up generators, supplies, etc., to facilitate business recovery and resumption following a disaster.

Objective 2

To encourage small businesses to reduce their vulnerability to a potentially disastrous event

Discussion

Redmond's small businesses are vulnerable to a variety of hazards, primarily earthquakes, flooding, and winter storms (see background information regarding earthquakes and ground shaking, and flooding in the Vulnerability of Single-Family Homes Section).

As previously stated, ground shaking is the principle hazard associated with earthquakes. Structural damage to older buildings, non-wood frame brick buildings, and newer buildings on soft soils may occur during and after severe ground shaking. Businesses located in Redmond's downtown and Old Town retail sector are on the soft alluvial soils of Redmond's seismic hazard area. Many of these businesses are also located in structures that are un-reinforced masonry buildings.

Redmond does not contain many areas subject to regular flooding events. Unpredictable flooding would be associated with creeks, wetlands, and storm water infrastructure. Isolated flooding does occur, especially backwater flooding along Bear Creek near Redmond Way beneath the railroad tracks. The Redmond City Center, where several small businesses are located, is located within the 100-year floodplain of the Sammamish River, putting small businesses at risk to flooding.

Action Items:

2.1 Provide incentives for property owners to retrofit un-reinforced masonry buildings and buildings on soft soils that are not tied to their foundations in hazard areas.

- Expedite permits, provide technical guidance, and refer qualified professionals to business owners who need assistance.
- Work with local banks, the county, and Washington State Seismic Safety Committee to provide property tax based incentives for retrofitting.

2.2 Train business owners to properly secure all non-structural items that could be a hazard through non-structural retrofit training.

2.3 Host forums for small businesses on mitigation and preparedness practices.

- Hold the meetings at times that are convenient for business owners in order to get as many as possible to attend. This will increase awareness of hazards and encourage business owners to adopt hazard mitigation and/or business contingency plans.
- Partner with neighboring communities to enable the business communities within and outside of Redmond to share knowledge and resources with each other

Goal 4: Reduce Vulnerability of Large Corporations

Redmond's large corporations and local small businesses are vulnerable to major economic impacts as a result of a hazard event.

Overview

Redmond's Large Corporations

Of the 4,500 businesses in Redmond, a handful consists of large corporations that employ over 1,500 people. These corporations serve regional, national, and international markets and attract widespread attention due to the valuable contributions they have made in telecommunications, medicine, and aviation. These contributions have helped increase the quality of human life and business on a worldwide scale and represent great economic posterity. Source: February 15, 2002 communication with Ed Billington, Operations Commander, Redmond Police Department, and Greater Redmond Chamber of Commerce website (http://www.redmondchamber.org/).

Location of Large Corporations and Hazard Scenarios

Several of the large corporations are located in the Overlake Advanced Technology/Manufacturing Center. The boundaries of the center are Bell-Red Road in the southwest, NE 20 Street in the south, 148 Avenue NE in the east, and SR 520, 156 Avenue NE, and NE 40 Street in the west. The large corporations in the center are vulnerable to two hazard scenarios: 1) a large-scale regional event, such as a severe earthquake; and 2) a catastrophic localized event, such as a terrorist attack or a rupture in the Olympic Pipeline. These hazard scenarios encompass a variety of vulnerabilities of large corporations and their associated local small businesses. Source: Redmond Comprehensive Plan.

Vulnerability of Regional Employment Sector

Redmond's large corporations are a regional employment center. The corporations employ 65,000 people, compared to the current City population of 45,260. Microsoft Corporation alone employs 20,000 and experiences a daytime population of nearly 40,000 in visitors, contractors, suppliers, deliverers, etc. The Redmond Comprehensive Plan states that by 2012, the number of jobs in Redmond is forecasted to increase by 76%. Impacts of a hazard event may decrease the productivity of the current workforce through job losses and losses in contracts of regional vendors. Source: May 23, 2002 communication with Robert Schneider, Redmond Emergency

Manager, Redmond Fire Department, Redmond Comprehensive Plan, and City of Redmond website (http://www.ci.redmond.wa.us).

Vulnerability of Transportation Lifelines

Bell-Red Road, 148th Avenue NE, and SR 520 act as key arterials linking the center with the greater City and region. A large-scale regional earthquake or a terrorist attack may disable these transportation lifelines. Disability of these transportation lifelines would affect movement of employees, movement of goods and services, and isolate the large corporations that depend on these key arterials for daily business operations. Source: February 15, 2002 communication with Ed Billington, Operations Commander, Redmond Police Department

Vulnerability of Local Small Businesses

Many of Redmond's smaller businesses act as suppliers, contractors, vendors, and tenant businesses to large corporations. Many local small business jobs are dependent on jobs in the large corporations and vice versa, although the exact ratio has not been calculated. If one imagines that five local small business jobs support one job in the large corporation, job losses in large corporations would adversely impact the small business employment sector.

Vulnerability of Local Contribution of Large Corporations

Redmond's large corporations provide many jobs for Redmond's residents as well as contracts for local small businesses. Large corporations also support tenant businesses and lease facility and warehouse space to them. General businesses, such as restaurants, retail stores, gas stations, etc., profit from the daytime population of large corporations as well.

An economic disruption to one or more of Redmond's large corporations will affect the future capability of attracting businesses to locate in the City, as well as retaining current businesses, if the local economic sector is non-productive. In addition, an economic disruption will directly affect the City's residential population through job losses, small business productivity through losses in contracts, and may ultimately decrease consumer spending and affect the City's tax revenues.

OBJECTIVES AND ACTION ITEMS FOR GOAL 4

Objective 1

To facilitate partnerships between large corporations and local small businesses

Discussion

Large corporations have the resources to mitigate and prepare for hazard events. They have knowledgeable staff, business resumption plans, insurance, training resources, emergency operation centers, and back-up facility space, equipment, and operating procedures. Large corporations work diligently to update their mitigation and preparedness strategies because they typically have a great deal to lose in a hazard event.

Local small businesses also have a great deal to lose in a hazard event, sometimes their entire livelihoods. Local small businesses typically do not have resources similar to large corporations. Many small businesses find Mitigation Planning cost-prohibitive and time-consuming, and the principles associated with mitigation seem complex.

Currently, there is no model in the nation that works to facilitate partnerships between large corporations and local small businesses. The City of Redmond would benefit from facilitating partnerships between its large corporations and its small businesses given their significant interdependency. Thus, the City is poised to embark on a unique community, public-private approach to reducing the impacts of economic disruption and hazard events.

Action Items:

1.1 Use hazard scenarios and involve the business community in risk assessment. Conduct an economic impact analysis. The analysis will act as a springboard for action.

- The economic impact analysis will identify:
- The ratio of local small business jobs to large corporation jobs and quantify risks.
- Potential losses in customer base due to extensive damage and relocation of large corporations and closure of tenant businesses and local vendors.
- Potential losses to the local economy including lost wages for workers, decreased revenues for businesses, and relocation of residents.
- Potential losses in decreased consumer spending and decreased tax revenues for local government.

Source: Federal Emergency Management Administration, 2000. Rebuilding for a More Sustainable Future: An Operational Framework, FEMA Project Impact, Edition 1, November 2000.

1.2 Develop a Project Impact-style program that focuses on raising citywide public awareness of business Mitigation Planning.

- Build community support. The City can lead the organization of a discussion group such as Contingency Planners And Recovery Managers (CPARM). CPARM members represent a wide variety of professionals in the contingency planning field and share best practices to increase disaster resiliency of the entire group. Source: Seattle Project Impact website (http://www.cityofseattle.net/emergency_mgmt).
- Lead public outreach and educational initiatives. The program can use the findings of the economic impact analysis (see action item 1.1) as a foundation to sponsor events and conferences to increase public awareness of business Mitigation Planning, i.e., what it is, what it entails, how it benefits businesses, etc.
- Seattle Example: Seattle Project Impact is embarking on an initiative to educate the Seattle business community of the benefits of business Mitigation Planning. The initiative involves organizing a forum for discussion among contingency planners and businesses, developing simple, reader-friendly materials, gaining further understanding of the City's business framework (i.e., who depends on whom and for what), creating a benefits package for participating businesses, and identifying non-traditional fund sources to build on Hazard Mitigation Planning goals. The Seattle initiative is in its beginning phases but once completed can be exported to other communities to use as a model.
- Increasingly, mitigation projects can qualify for Community Development Block Grants (CDBG) administered by Washington's Office of Community Development. The City

of Redmond can apply for CDBG funds under the guise of the General Purpose Grant, the Planning-Only Grant, or the Community Investment Fund Grant to fund Mitigation Planning and projects.

Source: Municipal Research and Service Center website (http://www.mrsc.org)

1.3 Partner with the Redmond Chamber of Commerce and the Small Business Administration to plan and develop a Business Resource Center.

- The Resource Center can be an ongoing information clearinghouse for the business community. The Resource Center can build on the public outreach and educational efforts in action item 1.2, provide guidance in business resumption plan creation, identify fund programs for mitigation projects, and showcase cooperative agreements between large corporations and small businesses.
- The Resource Center can educate new businesses on the importance of business Mitigation Planning, help the City facilitate partnerships between large corporations and local small businesses, and encourage new businesses to adopt business Mitigation Planning in their day-to-day business operations.
- The Resource Center can work concurrently with the City to identify ways to complement each other rather than being repetitive. The City can allocate staff time to the planning, creation, and maintenance of the Resource Center.
- Funding for the planning and development of the Resource Center could come from Community Development Block Grants, Economic Development Grants, Small Business Administration Fund Programs, and private foundations.

1.4 Encourage large corporations to include their small business vendors and tenant businesses in their emergency management planning.

- As mentioned previously, large corporations benefit from having a variety of resources aimed at strengthening their resiliency to hazard events. Large corporations can share their resources, thereby increasing their economic resiliency in their vendors and tenant businesses through the following suggestions.
  - Include small businesses in training exercises. Many large corporations have office space that mimics the impacts of a hazard event (i.e., broken light fixtures, toppled shelves, etc.) to educate employees on evacuation and search and rescue techniques. Small businesses would benefit from training exercises that large corporations have to offer.
  - Facilitate a mentoring program between large corporations and small businesses. Knowledgeable corporate staff can guide small businesses to create resumption plans, identify appropriate insurance plans, and refer qualified professionals for building retrofits, etc.

1.5 Facilitate cooperative agreements between large corporations and local small businesses in a recovery scenario.

- The City can facilitate partnerships between large corporations and local small businesses by identifying shared risks and opportunities. Large corporations depend on local vendors for production and local small businesses depend on large corporation contracts for production as well.

- Given the shared risks, the City can facilitate cooperative agreements that result in shared opportunities. Cooperative agreements may comprise of the following key components.
  - Local small businesses would agree to develop business resumption plans, train employees, and perform structural and non-structural retrofitting to protect their people, assets, and business operations.
  - Large corporations would agree to provide facility space and essential business functions (phone, fax, computer, etc.) during a recovery period so that small businesses can recover quickly.

Goal 5: Reduce Isolation Resulting From Disruption to Lifelines and Infrastructure

Hazard events may disrupt Redmond's complex network of transportation and utility infrastructure on small and large scales, affecting daily activities and commerce in Redmond and the region.

Overview

This issue primarily deals with interruption by hazard events of proper function of transportation and utility infrastructure. Redmond's geography makes it dependent on a limited number of travel corridors to move people and goods on a regional basis, and it can be left isolated when those connections are lost. Disruption to utility service similarly may leave neighborhoods or sectors isolated within the City. Certain utilities pose a risk to life and property if disrupted, such as gas or fuel pipelines and power transmission centers. This chapter deals with utility service provision. High-risk utilities will be addressed further in the Hazards Presented by High-Risk Utilities and Facilities chapter.

The action items address the vulnerability of lifeline and infrastructure systems to disruption from hazard events and address the capability of responsible parties to respond to disruption. Natural hazards that affect lifelines and infrastructure include landslides, flooding, earthquakes, winter storms, and wildfire. Anthropogenic hazards such as terrorism present threats to these systems.

Transportation and utilities are both key components of lifelines and infrastructure for Redmond's residents and businesses. This section is divided as follows:

A. Transportation

B. Utility Service

C. General Lifeline and Infrastructure Response Capability.

A. Transportation

Transportation Overview

Redmond is a destination, a corridor, and a point of origin for the region's population. These transportation demands hinge on a properly functioning network of arterials and highways that connect Redmond to other regional centers. Properly functioning transportation systems support this important role in the regional economy. Key transportation routes that convey

populations between Redmond and neighboring jurisdictions include state routes, principal arterials, and minor arterials.

Redmond's economy depends upon population distribution and the transport and delivery of goods and services. Redmond supports several key economic centers throughout the jurisdiction, including Overlake Advanced Technology Center, Downtown Urban Center, southeast Redmond, and Willows Road. The City also supports a fine-grained distribution of small businesses through the City.

As transportation demands on Redmond's infrastructure increase, the impacts of transportation disruption are magnified. The Redmond Comprehensive Plan forecasts increases in arterial volume over the next ten years of 20-70%.

OBJECTIVES AND ACTION ITEMS FOR GOAL 5 - TRANSPORTATION

Objective 1

To reduce the disruption to transportation infrastructure from hazard events, Redmond should reduce the vulnerability of transportation infrastructure to hazard events.

Discussion

Two natural hazards present the most risk to the transportation systems: landslides and flooding (refer to Appendix D for flooding and landslide risk). These may occur as primary hazards, or they may be secondary hazards due to earthquakes and winter storm events. There is little ability to directly address the other natural hazards such as earthquakes, winter storms, or fire that may disrupt transportation. Preparation and response would be key for these, as addressed in objective 3 below.

Terrorism threatens transportation infrastructure directly (principal transportation routes may be a target) or indirectly (transportation infrastructure disrupted secondary to attack on economic or political target). There is little that may be done to mitigate the risk of either of these attacks. Again, preparation and response will be key.

The risk posed to specific roadways by each main hazard event is discussed below.

Landslides

- Transportation systems located under areas of steep slopes, vegetation, and within flood-prone locations may be vulnerable to disruption from landslide events, which may be a primary hazard or a secondary hazard of earthquake and flooding events.
- The key roads in Redmond vulnerable to these events include portions of Redmond-Woodinville Road, Avondale Road, Union Hill Road, Sahalee Way, East Lake Sammamish Parkway N.E., and West Lake Sammamish Parkway N.E.

Earthquakes

- Bridges present points of vulnerability during earthquake hazard events. Most bridges serving the downtown core have been retrofitted; the 116th Street Bridge and bridges east of town may continue to present vulnerabilities.

- Road surfaces may experience substantial shift due to ground shaking and liquefaction, but this is unpredictable and would be addressed post-event. Disruption due to road failure may be widespread, but may be addressed through preparation and response mechanisms.
- Disruption from flooding and landslide hazards would be the most common secondary hazards of an earthquake event.

Flooding

- Minor nuisance flooding in Redmond characterizes the flooding hazard. Sources of flood events include streams, wetlands, and drainage infrastructure particularly in areas with changing character of development. Flooding may occur along Bear Creek and Evans Creek, particularly east of Redmond along SR 202 and in isolated neighborhood drainages.
- The Sammamish River has not presented flooding problems since its canalization in the 1960s. Backwater flooding from drainage infrastructure may present isolated occurrences of flooding along the Sammamish River.
- All of these flooding events present isolated points of disruption that may require local detours. Flooding along main roads presents the most impact on transportation infrastructure. Redmond-Fall City Road (SR 202) experiences regular flooding events during high rain periods, but no other main roads in Redmond appear to have regular flooding disruption.

Winter Storms

- Widespread traffic disruption may occur from winter storms. The primary sources of disruption would be from downed trees and utility lines and from unsafe roadway conditions. Little advance mitigation is possible except to decrease amounts of vegetation around vulnerable utility lines or roads or to ground utility lines.

Terrorism

- Terrorist acts may directly or indirectly affect transportation corridors. The most vulnerable locations would be main corridors (highways and arterials) that carry high volumes of commuters and products or primary roads associated with economic centers.
- The roads that serve the neighborhoods classified as "Urban Center (City Center)," "Advanced Technology/Activity Center (Overlake)," and "Research and Development, High Technology, and Manufacturing" are highly vulnerable to disruption from terrorism. These include SR 520 and Bell-Red Road in Overlake, SR 520 and surface roads through the City Center, Willows Road (Willows area), 148 Avenue N.E., N.E. 40 Street (Overlake), Union Hill Road, and Redmond-Fall City Road (southeast Redmond).

Action Items

1.1 Cooperate with neighboring jurisdictions and planning and transportation agencies to harden vulnerabilities of transportation routes. Regional planning should reduce transportation disruption between jurisdictions. The inter-connection of businesses and transportation networks in this region amplifies the effects of disruption of goods and

commuters across the region. Adjacent jurisdictions, the county, and the state must coordinate prevention and response to transportation disruption from hazard events on all scales.

- Identify and prioritize regional transportation corridors in order of their respective importance to community and business continuity throughout the region. Focus should be on key inter-local thoroughfares and regional transportation systems. The inter-jurisdictional arterial network represents an important supplement to highway capacity throughout eastside cities.
- Identify and prioritize key vulnerabilities of regional transportation routes. Prioritize the vulnerabilities based on importance of the disrupted route, the scale of the potential disruption, and the effectiveness of mitigation investments.
- Develop a strategy to harden transportation vulnerabilities on a regional basis, based on the prioritization of routes and vulnerabilities. In addition to addressing the hazard and the vulnerability, this may include identifying appropriate responders and establishing detour routes on a regional scale to expedite response to hazard events.
- The extensive research of the Eastside Transportation Partnership to identify regional priority road improvements provides key groundwork for this project. ETP's Mobility Action Priorities has identified regional priority routes and improvements. This action item would add the consideration of roadway vulnerabilities (landslide-prone slopes, frequently-flooded areas, seismic retrofitting, etc.) and disaster-response contingency plans (detour routes and response Strategies to the existing comprehensive analysis that has already been performed.

- The collaborative ETP framework brings together regional leaders of jurisdictions and agencies and provides a natural framework for further action. The City of Redmond is already engaged in transportation planning efforts in an intra-city and a regional context and has engaged neighboring jurisdictions and agencies in these efforts.
- Pending entry into a regional planning effort, Redmond may begin by comprehensive analysis and prioritization of vulnerable roadways within their jurisdiction and contingency planning with detour routes and response Strategies.
- Additional contributions of road priority research, of road vulnerability research, and of existing regional networks may come from Project Impact, Pillars transportation research, King County Transportation Coalition, Seattle Transit Initiative, and Puget Sound Regional Council.

1.2 Reduce vulnerability of key transportation routes within Redmond to natural hazard events. The key transportation routes that may be vulnerable to flooding and landslides include portions of Redmond-Woodinville Road, Avondale Road, Redmond-Fall City Road, Union Hill Road, Sahalee Way, East Lake Sammamish Parkway N.E., and West Lake Sammamish Parkway N.E.

- Prioritize vulnerable transportation systems (see 1.1 above). Address vulnerabilities based on prioritization.
- Mitigate unstable slopes through re-vegetation, structural measures, drainage improvements, and development restrictions as appropriate to the situation. Mitigate sources of flood events in ways that preserve natural channels and flows

as much as possible but that reduce the hazard risk through increased storage capacity, altered stream structure, or channel dynamics. Unstable slopes that threaten roads may also pose a risk to streams or wetlands at the toe and could represent a common goal for the transportation and natural resources groups.

- These assessments and mitigation approaches must be performed within the City of Redmond and in neighboring jurisdictions. Responsible agencies include Redmond's transportation and natural resources divisions of Public Works, King County Roads, WSDOT, and neighboring Public Works Departments among other agencies.

1.3 Perform seismic upgrades of bridges and roadways.

- Seismic retrofitting of bridges. Bridges that have not been retrofitted should be identified and retrofitted on an accelerated schedule. This may be part of a regional earthquake-retrofitting program administered by such organizations as Project Impact.
- Preventative road maintenance should improve road surfaces and sub-grade as necessary to promote stable roads through earthquake events. Roads in seismic or landslide hazard areas subject to liquefaction may be particularly vulnerable to disruption.

1.4 Increase travel route redundancy.

- Increase redundancy in routes and capacity to preserve travel patterns in the event of localized disruption. Identify alternative routes prior to events to enable rapid response.
- Increasing roadway capacity on alternate routes can decrease congestion in the event of traffic diversions. Capacity increases should be pursuant to previously identified transportation improvements in the capital facilities plan. Analysis of hazard mitigation needs for capacity and redundancy may allow re-prioritization of scheduled capacity capital improvements.

1.5 Support transit systems through transportation improvements.

- Transit systems may experience disruption during hazard events. These systems will usually rely on the high-priority roads for travel and, therefore, will be indirectly addressed through the above action items. Short-term displacement of transit-dependent workers should be addressed through the Community Resiliency to Large-Scale Regional Events section.

B. Utility Service

Utility Service Overview

Redmond's utility infrastructure has numerous independent source and distribution systems. The City, private or quasi-public utility companies, neighboring jurisdictions, the county, and the state provide services. This section describes utility infrastructure. Vulnerabilities and action items will be discussed in the following section.

Water

Redmond relies on groundwater wells for approximately half of its water source, supplying residents on the east side of the Sammamish River. The Tolt River (City of Seattle source) supplies water to residents west of the Sammamish River either directly through the Redmond system or indirectly through Bellevue and Kirkland water systems.

There are five main water distribution areas in Redmond. The main groundwater well service area is the portion of Redmond east of the Sammamish River and north of SR 520. The Overlake and Viewpoint service areas have un-metered connections to a joint-use pipeline owned by Redmond and Bellevue and connections to the Redmond Water System. The Redmond Water System also serves the Rose Hill area and Redmond Ridge.

Redmond's wells are located in the east side of the City. Well 3 is in a septic-system-dominated area. Wells 1, 2, 4, and 5 are located in Redmond's central commercial districts that are continuing to develop within the aquifer recharge areas for these wells. Approximately one-half of Redmond's water is derived from the City of Seattle Tolt Water System.

Electricity

Electricity service comes from Puget Sound Energy. The transmission center is located in west Redmond off of 132 Avenue N.E. and distributed throughout the City. This City of Redmond transmission center is the primary transmission center for the entire region. Disruption of this transmission center would have ramifications for tens of thousands of businesses and residents throughout the region. The High-Risk Utilities and Facilities chapter will address the transmission center as a high-risk facility in the Hazards Presented section.

Telecommunications

Telecommunications facilities are distributed throughout the City. Cell phone towers and remote telephone switches are located throughout the City and the neighboring areas. Most major arterials within Redmond provide conveyance for major telephone feeder or cable trunk lines. Fine-grained networks distribute services from these main lines to neighborhoods and economic centers.

Natural Gas

Natural gas is supplied through the Northwest Gas pipeline running east of the City through the City of Redmond watershed and Union Hill. The main distribution point is the Redmond Gate Station on Union Hill Road. High-pressure gas mains convey natural gas along Union Hill Road, Avondale Road, and 148 Avenue NE. Puget Sound Energy owns and maintains the natural gas pipelines. The High-Risk Utilities and Facilities chapter will address the gas lines as a high-risk facility in the Hazards Presented section.

Olympic Pipeline

The Olympic Pipeline runs parallel to 134 Avenue N.E. on the west side of Redmond. It is part of a 400-mile fuel pipeline that spans Washington and Oregon. The High-Risk Utilities and Facilities chapter will address the pipeline as a high-risk utility in the Hazards Presented section.

Sewer

Wastewater service is provided by the King County METRO system, administered by King County, and piped to Seattle for treatment. Pump stations and facilities are located throughout the City. The METRO transmission line runs along West Lake Sammamish Parkway, Redmond-Fall City Road, north along the Sammamish River, and west along NE 124 Street.

A few areas of Redmond (along the Sammamish River and in north and east Redmond) and most proposed annexation areas are on septic systems. Future extension of infrastructure to these areas will rely on the METRO system for treatment. At present, education and assistance by the City should ensure proper maintenance, operation, and gradual phase-out of these septic systems.

Waste Management

Redmond relies on private companies for collection and on King County for transport and storage of the City's solid waste.

OBJECTIVES AND ACTION ITEMS FOR GOAL 5 - UTILITY SERVICE

Objective 2

To minimize utility service disruption from hazard events, the City of Redmond should reduce the vulnerability of utility production and distribution systems.

Discussion

Risk to utility infrastructure may be specific to each type of utility. Most utilities rely on a main hub and a distribution network, each of which is vulnerable to different types of disruption. Certain utilities, such as natural gas lines, the Olympic Pipeline, and the electricity transmission center, may represent a hazard in and of themselves as will be discussed in objective 3.

The following section discusses the respective vulnerabilities of utility systems as it relates to proper utility service and makes subsequent action items for each system. It is important to prioritize vulnerable systems in order of their respective importance to community and business continuity. Focus should be on regional utility systems and service to key economic centers. Mitigation measures may target the hazard (i.e., reducing landslide risk that threatens vulnerable power lines) or target the utility (i.e., grounding the vulnerable power lines).

Action Items

2.1 Reduce the vulnerability of utility infrastructure, hubs and distributions systems.

- Protect hubs from natural and anthropogenic hazards. This may include structural retrofitting, addressing landslide hazards, moving highly vulnerable hubs to less hazardous locations, restricting access, moving to locations with more alternative transportation access routes, and creating a fire-defensible space around the centers.
- Assess and ensure redundancy in utility systems. This can help reduce overloading and provide back-up sources of service. This may be done through public/private partnerships for corporate entities.

Utility-Specific Vulnerabilities

Water

- There is a risk of contamination to Redmond's groundwater systems from polluted surface water, ground water, or hazardous material spills. Increasing levels of imperviousness in aquifer recharge areas may contribute to depleted groundwater resources. Issues such as contamination and aquifer recharge are being addressed through the City of Redmond's inter-departmental Wellhead Protection Program. The source and distribution lines of the groundwater system may both be vulnerable. Water storage tanks are located on the periphery of western Redmond and within eastern Redmond. Storage tanks may be jointly owned with other cities.
- The distribution line represents the main vulnerability for the Tolt system. The City's groundwater distribution pipelines are equipped to re-distribute well water to the Tolt service area, although this has not been tested. The groundwater system is supplemented with Tolt water during the dry summer months.

Utility-Specific Action Items:

Water

2.2 Ensure adequate function of citywide Tolt water distribution.

- Perform a test re-distribution of the City's drinking water supply in the event of contamination of groundwater. This would involve a temporary diversion of the City of Seattle Tolt drinking water system to the areas supplied by Redmond's groundwater.

2.3 Preserve the open and uncontaminated state of key aquifer recharge areas.

- Wellhead protection guidelines help prevent contamination or reduced recharge to this portion of the City's drinking water. These guidelines are in the final stages of development at the time of writing.

Utility-Specific Vulnerabilities

Wire-Dependent Utilities (electricity, telecommunications)

- The Puget Sound Energy transmission center serves the entire region. The local economy depends on adequate function of this power distribution center.
- The distribution network represents a vulnerability of the system. Overhead distribution lines and vegetation make the older parts of Redmond more vulnerable to electricity disruption. These areas include parts of eastern Redmond such as Rose Hill and Education Hill. Redmond requires linear distribution systems to be buried in association with new development.
- Puget Sound Energy has worked closely with the City to improve grid transmission, prune trees around power lines, and bury power lines in older neighborhoods, resulting in a marked decrease in power disruption to communities. Puget Sound Energy also works closely with its main corporate customers in Redmond to ensure proper restoration and maintenance of electricity in the event of power disruption.

Utility-Specific Action Items:

Wire-Dependent Utilities

2.4 Assess the vulnerability of the electricity transmission center.

- The main risk of electricity service disruption is from the transmission center as a potential target. Vulnerabilities surround such issues as access, security, or building design. The main natural hazard disruption would be earthquake damage. This is addressed further in the Hazards Presented by High-Risk Utilities and Facilities chapter.
- Given the importance of electricity service to the local economy, the City of Redmond Fire Department or Emergency Services may work out a response plan with Puget Sound Energy to provide early responder services there in the event of any hazard.

2.5 Reduce the vulnerability of wire-dependent utility systems.

- Bury linear distribution systems (wire- or pipeline-dependent utilities). Redmond should adopt an incentive program to encourage utility companies to bury utilities (i.e., expedited permits, shared projects costs for joint construction efforts (roads and utilities cooperation).
- Prune vegetation around distribution lines to minimize the chance of disruption from falling trees (from landslides or winter storms) and wildfire. Puget Sound Energy has an aggressive pruning protocol to protect aboveground power lines. Further public education could reduce the likelihood that citizens will plant vegetation near power lines.

Utility-Specific Vulnerabilities

Natural Gas and Olympic Pipelines

(Please refer to Hazards Presented by High-Risk Utilities and Facilities chapter.)

Utility-Specific Vulnerabilities

Wastewater

- Wastewater collection and treatment systems present a hazard of spill or accumulation of volatile materials along their collection lines and central treatment facilities. Redmond relies on King County METRO to maintain and preserve the sewage system. These lines are buried and represent minimal risk of breakage except in cases of earth movement.
- In the remaining septic-served areas, education and assistance by the City should ensure proper maintenance, operation, and gradual phase-out of the systems.

Utility-Specific Action Items:

Wastewater

2.6 Identify and mitigate points of vulnerability for sewer infrastructure.

- Work with King County/METRO to identify vulnerabilities of sewer pipelines. This is of particular concern where sewer pipelines travel along the Sammamish or near neighborhoods and where pipelines may be above ground. King County may have performed a vulnerability assessment following the Nisqually earthquake. These vulnerabilities should be identified and appropriately mitigated.

Utility-Specific Vulnerabilities

Waste Management

- Collection and storage capacity may be limited after a hazard event. A regional hazard may produce large amounts of debris and delay response time so as to impede proper collection and require expenditures for excessive storage, collection, and transport of debris material.

Utility-Specific Action Items:

Waste Management

2.7 Prepare for adequate waste storage and management in response to a hazard event.

- Identify possible storage areas for debris and waste that may accumulate during a regional event (i.e., publicly-owned vacant lots or parking areas, parks where environmental impacts would be minimal). Prepare a strategy that separates debris in ways that facilitate recycling and proper disposal upon resumption of service.

C. General Lifeline and Infrastructure Response Capability

General Response Capability Overview

A combination of local, neighboring, jurisdictional, county, and state agencies, along with private and quasi-public utility companies, hold responsibility for the maintenance of transportation and utility infrastructure. Of particular importance to restoring disrupted service are public governmental agencies and first responders.

OBJECTIVES AND ACTION ITEMS FOR GOAL 5 - GENERAL LIFELINE AND INFRASTRUCTURE RESPONSE CAPABILITY

Objective 3

Ensure adequate public sector, inter-jurisdictional, and private sector response capability to overall infrastructure disruption.

Discussion

Utility and transportation responders should be fully prepared and equipped for rapid response to restore function to communities and businesses in vulnerable areas (response to traffic lights, power outages, road closures, etc.).

During a small-scale or a catastrophic localized event, Redmond can rely on adequate numbers of personnel and response assistance from the responsible parties. A large-scale regional earthquake would strain response capacity within Redmond and across the region. This is addressed more directly in the Community Resiliency to Large-Scale Regional Events section.

Action Items:

3.1 Ensure public sector response capability.

- First responder systems are of primary importance, but similarly important are Public Works and Utility crews who will respond to infrastructure disruption. Response may be compromised by loss of power or ingress/egress routes in the vicinity of response teams. Redundancy in location, infrastructure, and alternative transportation routes for these key responder units.
- Key operations centers and response team headquarters should be moved out of vulnerable areas (particularly seismic hazard areas). This is addressed further in Community Resiliency to Large-Scale Regional Events.
- Ensure that all appropriate public response departments and units have comprehensive maps of the locations and shut-off points of high-risk utilities. Work with appropriate utility and public departments to develop coordinated response plans to address risks to life, property, and community/economic infrastructure. The High-Risk Utilities and Facilities section addresses this further in Hazards Presented.

3.2 Develop response strategies based on route priorities.

- Plan for rapid and direct response to transportation disruption on the key transportation corridors and product supply/delivery routes that Redmond's large corporations rely upon for business continuity.
- Identify key transportation corridors vulnerable to hazard events. This should include a standing prioritization of the most important roads, systems, or neighborhoods for response in the event of widespread disruption.

3.3 Strengthen private sector role in response capability.

- Promote communication and cooperative planning between corporations and businesses that work closely with one another and rely on communication and transportation systems for their joint business interests. Strategic planning between business partners can help overcome infrastructure disruption. The Chamber of Commerce or other business associations may facilitate these connections.
- Neighborhood and business preparation for post-hazard isolation and response can help alleviate the burden on public agency response capability.

Goal 6: Reduce Hazards Presented By High-Risk Utilities and Facilities

Certain high-risk utilities and facilities may present a hazard to Redmond's citizens, businesses, and property, should these utilities be disrupted during a hazard event.

Overview

The Olympic Pipeline, natural gas pipelines, the main power transmission center for Puget Sound Energy, and hazardous chemical storage sites represent the four main high-risk utilities or facilities in the City of Redmond. Other utilities may present a secondary hazard under certain circumstances (contaminated drinking water, downed power lines, or broken sewer main). The hazard presented in these cases is generally smaller and is addressed in the previous Isolation Resulting from Disruption to Lifelines and Infrastructure section.

Olympic Pipeline

- The Olympic Pipeline runs parallel to 134 Avenue N.E. on the west side of Redmond. It is part of a 400-mile fuel pipeline that spans Washington and Oregon (refer to Olympic Pipeline map in Appendix E).
- The pipeline runs through large sections of western Redmond mapped as landslide or erosion hazards. The pipeline is located above Willows Road N.E./140 Avenue N.E. Areas that are mapped as landslide hazards are located between N.E. 85 Street and N.E. 124 Street in the vicinity of N.E. 126 Place, and N.E. 137 Place through the northern City limits. A large number of residential and commercial properties are located in this vicinity and would be vulnerable during a hazard event that involved these pipelines. The pipeline is buried through most of its length but is exposed in places.
- Many of the landslide areas crossed by the pipeline are the headwaters for seeps and streams in western Redmond, making not only these stream systems but also the confluent Sammamish River vulnerable to contamination.
- Redmond is working on a response plan to deal with Olympic Pipeline hazard events. The managing company and the City of Redmond have a working relationship. The Redmond Fire Department is trained with regard to shut-off valves and response procedures in the event of disruption to the pipeline.

Natural Gas Pipelines

- The Northwest Gas pipeline runs east of the City through the City of Redmond Watershed and Union Hill. The main distribution point is the Redmond Gate Station on Union Hill Road. High-pressure gas mains convey natural gas along Union Hill Road, Avondale Road, and 148 Avenue N.E. Gas lines are buried for the most part.
- Certain portions of natural gas pipeline routes are near landslide hazards. High-pressure natural gas mains run along Union Hill Road, 148 Avenue N.E., and Old Redmond Road. Portions of these routes are near the toe of mapped landslide hazard areas. As with the Olympic Pipeline, residential and commercial properties would be vulnerable during a hazard event.
- Puget Sound Energy coordinates with Redmond Fire Department on response, holding bi-annual trainings and educating local personnel on the workings of the pipeline. The Redmond Fire Department responds to many small gas leaks every

year, often due to accidental encroachment on the pipeline by landowners unaware of its presence. Redmond would rely on PSE response teams in the event of disruption to the Northwest Gas Pipeline.

Power Transmission Centers

- The transmission center is located in west Redmond off of 132 Avenue N.E. and distributed throughout the City. This City of Redmond transmission center is the primary transmission center for the entire region.
- Power transmission centers represent specific points of high risk, presenting a risk of fire to the surrounding vicinity should it be the target of a terrorist action.

Hazardous Chemical Storage Facilities

- Hazardous chemical storage facilities are distributed at a number of locations throughout the City, concentrated mostly in commercial areas. The Unisea seafood processor is ranked by the Redmond Emergency Management Department as the highest concern due to high amounts of anhydrous ammonia at the site. A number of other chemical sites may also pose significant risk to the community.
- The City has documentation of hazardous chemical storage sites that report to the King County Local Emergency Planning Committee. Redmond tracks hazardous material storage sites as reported under LEPC.
- Current Groundwater Protection Ordinance planning in the aquifer recharge areas (most of central Redmond) may require an inventory of all hazardous chemicals, operations plans, performance standards compliance, and certain other permits and requirements based on the location of the business and type of chemical at the site. This work is still in draft form and will continue to work to establish best management practices and location guidelines.

OBJECTIVES AND ACTION ITEMS FOR GOAL 6

Objective 1

To reduce the risk posed by high-risk utilities and facilities and address the vulnerability of these systems.

Discussion

All of these action items should be performed in cooperation with the Redmond Fire Department, Public Works Department, and local or regional public and private utility companies.

Action Items:

1.1 Reduce the risk surrounding an Olympic Pipeline rupture.

- The Olympic Pipeline runs along landslide-prone slopes for much of its length through Redmond. Slopes must be assessed for stability, restoration and re-vegetation needs, and needed drainage improvements. Strict site design, storm water drainage, and vegetation retention standards shall be applied to these areas

to preserve slope stability. At areas of vulnerability to landslides, sensors triggered by slope movement could provide an early warning system for response. Identify areas where the Olympic Pipeline is exposed above the ground and explore possibilities of burying pipeline.

- Strengthening the structure and integrity of all high-risk utility systems and high-risk facilities may include such measures as:
  - Increased frequency of shut-off valves.
  - Remotely located control capabilities.
  - Structural retrofitting of these high-risk systems.
  - Restriction of access.
  - Adequate signage all along pipelines to prevent accidental disturbance.
  - Frequent inspections to ensure compliance with safety/performance standards.
  - Relocation to minimize the property and residents vulnerable to these hazards.
- Identify response capabilities. Redmond has completed a response plan to deal with Olympic Pipeline hazard events. The managing company and the City of Redmond have an excellent working relationship. The Redmond Fire Department is trained with regard to shut-off valves and response procedures in the event of disruption to the pipeline. Further coordination of protocols and capabilities continue and will improve response.
- Public education to notify local citizens of the presence of a high-risk utility or facility in their neighborhood will improve the preparation and response by local residents. Education priorities include detecting warning signs, knowing appropriate contacts in the event of an emergency, understanding site-specific concerns, and knowing evacuation routes.
- Redmond and the Olympic Pipeline Company have information about the location and vulnerabilities of the route. Redmond will evaluate performing a more extensive analysis of the pipeline route including GIS assessment of parcels, drainages, ownership, and flow routes, field assessments of vulnerabilities, and work with neighboring jurisdictions on cross-border reduction of vulnerabilities and on response.

1.2 Reduce the vulnerability of high-risk utility and facility infrastructure to hazard events in order to reduce the risk to life and property of Redmond's residents and businesses.

- Assess slope stability, landslide vulnerability, and exposure of high-risk utility and facility structures.
- Strengthen the structure and integrity of all high-risk utility systems and high-risk facilities, including such measures as referred to in action item 1.1 above.

1.3 Ensure adequate response capability

- Redmond and the pipeline companies have established response protocols. Ensure that post-event protocols are also fully developed, including protocols for cleanup and disposal of waste.

- Private companies primarily operate high-risk chemical storage facilities. Emergency response protocols should be fully coordinated with the Fire Department and first responders. Clear protocols for response by private and public agencies must be addressed and established.
- Please refer to objective 3 in the Isolation Resulting from Disruption to Lifelines and Infrastructure section for further action items about inter-jurisdictional and private sector response.

1.4 Educate neighboring residents about hazard and associated risks.

- Public education to notify local citizens of the presence of the high-risk utility or facility in their neighborhood will improve the preparation and response by local residents. Additional public education must be explored through local community groups, neighborhood associations, and homeowner/apartment associations. Information may be provided through property purchase disclosure requirements.
- Residents play an important part in detecting the first signs of high-risk utility or facility disruption (i.e., detection of chemical or natural gas odor). With buried pipelines, neighbors may be unaware or unconcerned about the risk posed by the utility. Education and preparation will be very valuable training for all parties. Education priorities include detecting warning signs, knowing appropriate contacts in the event of an emergency, understanding site-specific concerns, and knowing evacuation routes.

Goal 7: Preserve and Enhance the Natural Environment

Future regional growth may alter hydrologic processes in Redmond's stream, wetlands, and sub-surface water systems. This may increase the risk of flooding or landslides to Redmond's residents, structures, and infrastructure. Appropriate development within and outside of Redmond can help protect life and property from hazard events while preserving the integrity of Redmond's valued natural systems.

Overview

Redmond faces a relatively small risk of flooding and landslide events at this time; however, Redmond's sixteen-square-mile area is a small part of the Bear Creek/Evans Creek Basin and the Sammamish River Watershed. Just as Redmond is developing rapidly within its boundaries (the Comp Plan forecasts 15,600 more residents between 1995 and 2012), growth is modifying large areas upstream of Redmond in the Bear Creek and Evans Creek corridors.

Development increases levels of impervious surface, degrades stream structure, and compromises natural vegetation and soil structure. The resulting altered storm water delivery patterns can change the frequency, severity, timing, and probability of flooding and landslide events. These changes can present a risk to life, property, and daily function for Redmond residents. The 1989 Bear Creek Basin Plan forecasts a loss of 18,000 acres of forest and 1,300 acres of wetlands to development. There will be an inevitable expansion of the 100-year floodplain as upland development aggravates flooding and drainage conditions downstream and down slope.

Although Redmond has a comprehensive set of development standards that hold new development to rigorous environmental and storm water protections, its position at the mouth of

the sub-basin and its topographic setting subject it to hydrologic changes from upstream development.

OBJECTIVES AND ACTION ITEMS FOR GOAL 7

Objective 1

To protect the future quality of life and environment for its residents, the City of Redmond should reduce vulnerability to changing hazard regimes.

Discussion

Densification in an urban setting presents a number of challenges: to adequately mitigate the impacts of development on surface water and storm water delivery, to direct development away from sensitive areas in order to protect these resources and reduce the risk of damage to life and property from changing hydrologic regimes, and to preserve the high quality natural environment that is valued by the City and its citizens.

Areas that may be marginally vulnerable to hazard events may become increasingly vulnerable as hydrologic and development conditions change over time. Redmond should monitor and respond to these conditions, integrating preventative and restorative action items as appropriate.

Planning policies that preserve key habitat elements and direct capital expenditures for habitat restoration may contribute to the goals of reducing risk from natural hazards. Redmond's strict storm water infrastructure standards help new development contain and mitigate the effects of runoff from impervious surfaces on the environment. Comprehensive plan and development regulations protect natural systems through impact fees, permit conditions, site design requirements, storm water standards, restricted slope development, native vegetation protection measures, tree preservation ordinances, and critical area regulations.

Many older residential and commercial areas of Redmond do not support adequate storm water infrastructure, including the downtown City Center. These areas are being retrofitted to introduce adequate storm water storage capacity in association with new development. On a site-by-site basis, the Public Works Department addresses drainage issues as they arise.

Action Items:

1.1 Restore natural drainage capacity and structure of streams and wetlands to address future changes in flows.

- Restore stream and wetland structure and capacity. This should include key habitat elements along Bear Creek, in partnership with King County and other jurisdictions and as identified in guiding Bear Creek habitat analyses. Natural stream and wetland systems should be protected and restored to full capacity and function in order to capitalize on natural drainage systems.
- Cooperation between the Natural Resources and Public Utilities/Storm Water Departments to coordinate Public Works drainage projects with stream and wetland restoration goals. Restoration of stream integrity can reduce the occurrence of flooding on current and future developments.

1.2 Identify areas of opportunity for stream and floodplain restoration following hazard events.

- The amount of flooding that causes direct property damage is limited in Redmond, but certain properties may provide important areas to target for buyouts and restoration using post-disaster recovery money.
- Properties could be restored for off-channel storage capacity. Improving floodplain storage may decrease the incidence of nuisance flooding and may be important hydrologic infrastructure to buffer future floodplain increases.

1.3 Identify areas of opportunity for storm water retrofitting to maximize drainage infrastructure.

- Periods of re-development, such as post-earthquake recovery, road reconstruction, utility grounding, and extensive new development projects, provide opportunities for storm water retrofitting. Older neighborhoods of Redmond such as the Old Town City Center lack adequate storm water infrastructure and may experience more frequent incidents of flooding as development increases the surrounding levels of imperviousness.
- Identify neighborhoods that lack adequate storm water infrastructure. Once the need is identified and planned, retrofitting may be scheduled with Capital Improvement Plan activities or may be implemented during post-hazard recovery. Refer to Long-Range Recovery Plan for Redmond's Old Town District for additional information.

1.4 Target landslide-prone areas for pre- or post-event restoration and acquisition.

- Identify areas at risk from landslide events and evaluate the possibilities for pre- and post-event buyout of properties with high vulnerability. Future restoration may stabilize these sites and reduce the vulnerability of surrounding properties.
- Local Improvement Districts may be organized with local landowners to finance slope stabilization projects and hydrologic improvements in slide-prone areas. These may be organized through public outreach by the City of Redmond to organize community initiative and response.

1.5 Pursue public land acquisition strategies and landscape-level habitat coordination efforts.

- Build partnerships through inter-local agreements and watershed action plans between Redmond, neighboring cities, and King County. Work to direct and design future development to preserve the integrity of natural systems and minimize aggravating factors that affect the occurrence of natural hazards. Coordinate sensitive area regulations to provide consistency between jurisdictions. Utilize GIS and modeling capabilities to identify the points in the watershed that contribute the most to hydrologic stability and prioritize protection accordingly.
- Investigate development right transfers that recognize hazard-prone areas as appropriate and priority sending zones for development rights. Regulations may specifically encourage this type of program to promote enrollment of lands in hazard-prone areas.
- Develop partnerships between the City of Redmond Parks, Planning, and Natural Resources Departments to preserve landscape features that are prone to natural

hazard events or that contribute to the stability of natural systems. These may include:

- Historic agricultural floodplains along Bear Creek/Evans Creek and the north Sammamish Valley. Historic farms and rural areas in the floodplain provide excellent opportunities for historic preservation, public park use, and floodplain storage.
- Landslide-prone slopes. These acquisitions are particularly important after slides have occurred to reduce risk to life and property.
- Fee-simple acquisition, conservation easements, development right transfers, and current-use taxation programs are appropriate methods of land protection.

Goal 8: Reduce Vulnerability of Historic and Cultural Resources

Old Town is a community and regional asset and merits a community-wide approach to reduce the impacts of hazards.

Overview

Old Town - Historic Design Sub-Area and Redmond Hazard Areas

The sub-area boundaries are N.E. 80 Street to the north, 160 Avenue N.E. to the east, 164 Avenue N.E. to the west, and Leary Way and N.E. 76 Street to the south. The sub-area is located in the City Center/Downtown neighborhood. The sub-area contains many historic landmarks that are valuable historic and cultural resources in the City of Redmond and in the greater King County region. The Sub-area is located in Redmond's Seismic Hazard Area, and several historic properties are located within Redmond's 100-Year floodplain. Historic landmarks in these hazard areas are vulnerable to a variety of hazards, namely earthquakes and flooding, as well as secondary hazards such as fires and landslides. Refer to the Redmond Flooding - Historic Sites/District Map (Appendix F), Redmond Seismic Hazard - Historic Sites/District Map (Appendix G), and the Historic Design Sub-Area Boundaries Map (Appendix H).

Designated Historic Landmarks and Existing Conditions

Currently, Redmond has 16 historic landmarks and sites, plus 14 properties and four sites that are largely designated as rural/agricultural. A majority of Redmond's historic landmarks were built between 1890 and 1910 and are located in Old Town. About half of the buildings are wood-frame, while the remaining buildings are masonry – some of which are un-reinforced masonry. Given the age and construction of these properties, these properties most likely would not withstand a large-scale hazard event such as a severe earthquake. Wood-frame properties that are not bolted to their foundations and un-reinforced masonry properties will experience significant structural damage. Additionally, some of these historic landmarks lack fire response systems and adequate drainage systems given their age. These existing conditions cast additional vulnerability to historic properties. Source: Redmond Comprehensive Plan, February 15, 2002, and April 19, 2002 communication with Dianna Broadie, Planner, Redmond Department of Planning & Community Development.

Potential Historic Landmarks

Currently, there are over 75 potential landmarks concentrated in the City Center/Downtown neighborhood. These potential landmarks add value to the overall community character downtown and are also vulnerable to earthquakes, given their location in Redmond's Seismic Hazard Area. These potential landmarks would affect downtown if destroyed. Source: April 19, 2002 communication with Dianna Broadie, Planner, Redmond Department of Planning & Community Development.

Previous Occurrences with Hazard Events

A fire in the early 1900's damaged several wood-frame properties in the area. After the fire, people began to construct masonry buildings to protect properties from the impacts of future fires. Those wood-frame buildings that survived the 1900's fire event remain vulnerable to fires today.

There was almost no adverse impact from the February 28, 2001 Nisqually Earthquake. Little mortar dust was found and the only structural failure involved a chimney located in Conrad Olsen Park, a designated historic site. The Nisqually Earthquake was largely geographic specific to areas west of Lake Washington, namely Olympia, Tacoma, and Seattle, and ground shaking as a result of the earthquake was minimal in Redmond. A similar type of earthquake or a larger scale earthquake occurring in Redmond would cause significant structural damage to historic landmarks and potential landmarks. Source: April 19, 2002 communication with Dianna Broadie, Planner, Redmond Department of Planning & Community Development.

Vulnerability of Transportation Networks and Small Businesses in Old Town

Cleveland Street and Leary Way are key arterials that allow many people to move through the sub-area. Leary Way can be used to reach Redmond Town Center and those traveling east through the sub-area can use Cleveland Street. There are several historic landmarks that are located along these two arterials. As mentioned previously, several historic landmarks will not withstand a large-scale hazard event such as a severe earthquake, and building debris in the arterials would disable Old Town's transportation networks. Refer to Historic Design Sub-Area Map (Appendix H).

There are many small businesses unique to downtowns that are housed in historic landmarks. These small businesses would experience adverse impacts in a hazard event if: 1) the property that houses their businesses is not retrofitted to withstand significant structural damage, and 2) the small business lacks a contingency plan focused on resuming business operations after a disaster occurs. In addition, many small businesses and/or property owners do not have funds to retrofit their properties, lack the knowledge to lead a retrofit project, and may not see the economic and cultural benefits of retrofitting.

Rapid Screening Procedure (RSP)

The Federal Emergency Management Administration (FEMA) issued the RSP and uses a methodology based on a "sidewalk survey" of a building and a Data Collection Form, ATC-21, which a person completes based on visual observation of the building. FEMA encourages local jurisdictions to use the RSP method to begin a local retrofitting program.

In 2000, students from a University of Washington Urban Planning Studio completed ATC-21 forms for many historic landmarks and potential landmarks located in Old Town and in the

greater City Center/Downtown neighborhood. Students surveyed un-reinforced masonry properties, wood-frame properties, and masonry properties.

The findings show that un-reinforced masonry buildings scored less than 1, reinforced masonry buildings received a score of 2, and wood-frame buildings averaged a score of 3. These scores were calculated utilizing the ATC-21 form. The numerical scores denote the approximate level of seismic performance of a property, although an in-depth inspection conducted by qualified seismic engineers is encouraged. Scores typically range from 0 to 6, with higher scores corresponding to better seismic performance.

Refer to Appendix J for a summary of the RSP and completed copies of the ATC-21 forms. Source: Federal Emergency Management Agency. FEMA 154/July 1988. Rapid Visual Screening of Buildings for Potential Seismic Hazards: A Handbook.

Work in Progress

In late 2001, City staff proposed a comprehensive set of incentives that could provide assistance for property owners to bring their masonry structures up to existing code. City staff is also working to present information regarding an Inter-Local Agreement with King County. Partnering with King County will allow the City to access a broader range of funding sources for retrofitting historic landmarks. Currently, there are few City-sponsored plans and/or programs that address hazard mitigation strategies focused on historic and cultural resources. Source: February 15, 2002 and June 7, 2002 communication with Dianna Broadie, Planner, Redmond Department of Planning & Community Development.

OBJECTIVES AND ACTION ITEMS FOR GOAL 8

Objective 1

Retrofit designated historic landmarks.

Discussion

Historic landmarks are valuable community and regional assets. Historic landmarks contribute cultural and historic significance, cultivate character and sense of place in Redmond, and house one-of-a-kind businesses in the midst of a growing City encompassed by high-technology and biomedical corporations. Historic landmarks contribute to Redmond's high quality of life and are of immense community and regional public benefit.

Planning to mitigate the impacts of hazard events such as a large-scale regional event will increase the survivability of Redmond's historic landmarks and potential landmarks. One significant strategy to mitigate the impacts of hazards is retrofitting historic properties. Retrofitting will increase the life safety of those who live in, conduct business in, and/or visit historic landmarks. Retrofitting will also increase the survivability of historic properties, reduce the amount of structural debris in transportation arterials, and reduce the impacts to the one-of-a-kind small businesses that are housed in historic properties. Although retrofitting does not guarantee that a building will survive a hazard event, retrofitting can reduce the likelihood of demolition and make repair more economically feasible.

Although the solution to reducing the impacts of hazards is simple - retrofitting - the process to retrofit a historic landmark involves various issues, namely funding, local government support, and public support in order to be successful.

Obtaining funds for retrofitting historic landmarks is competitive. Many fund programs, whether they are sponsored by national, state, county, or private entities, require specific criteria to be met. Many fund programs are contingent upon the landmark designation procedure that a local government develops. Local governments that follow national, state, and county landmark designation procedures will benefit the most by being eligible for a broad range of fund programs. For example, entering into an “Interlocal Agreement” with King County will allow Redmond to take part in the county's fund programs.

Local governments can play a key role in leading retrofitting efforts, not only in applying for retrofitting funds or providing retrofitting incentives for property owners, but also in educating the public of the benefits of retrofitting. One significant benefit, in addition to protecting community character and history, is increasing the resiliency of small businesses that are housed in historic landmarks. These small businesses make up the traditional business district. They also act as a foundation to explore larger historic preservation initiatives such as the National Main Street Program, a program that combines rehabilitation and retrofit of historic landmarks with downtown economic revitalization.

Public support for retrofitting will contribute to Hazard Mitigation Planning; however, building public support may be difficult. Many property owners of historic landmarks have limited funds to retrofit, do not see the community and economic benefits of retrofitting, are fearful of losing their private property rights, and are inundated with the knowledge of undergoing a complex retrofitting project. Those leading a retrofit must take great care in raising the seismic performance of a property while maintaining its historic integrity. Local governments should work to encourage public support, develop public-private partnerships, and decrease the financial and administrative burdens on private property owners. For example, adopting building code flexibility for retrofitting un-reinforced masonry buildings will decrease the burden on retrofitting projects.

Action Items:

1.1 Create an inventory of un-reinforced masonry and wood-frame historic landmarks.

- As a first step to encourage retrofitting, the City should inventory vulnerable historic properties to determine retrofitting needs and prioritize retrofitting projects.
- The City can begin by utilizing the Rapid Screening Procedure developed by FEMA and subsequently conducting a more technical, in-depth inspection of individual buildings.

1.2 Develop incentives to encourage retrofitting. Possible incentives could include:

- Building code flexibility. Pre-hazard retrofit is costly and is unlikely to occur without modified building codes that facilitate economically feasible, incremental improvements in building safety. For example, the Uniform Code for Building Conservation (UCBC) and the State Historic Building Code ". . . attempt to apply different standards for un-reinforced masonry buildings that would improve building safety in California."

Source: Federal Emergency Management Administration and American Planning Association, 1998. Planning for Post-Disaster Recovery and Reconstruction, Chicago, IL: American Planning Association (Page 298-299)

- Property tax relief. King County administers a Special Tax Valuation for Rehabilitated Historic Properties Program. For up to ten years, qualified rehabilitation costs will be subtracted from the total assessed value of the property. Projects such as the Maloney Store in Skykomish, the McGrath Café & Hotel Building in North Bend, and the North Bend Theater were retrofitted in part as a result of special tax valuation. The City of Redmond can take advantage of this program only if the City enters into an "Interlocal Agreement" with King County. See action item 1.6 for further discussion.

Source: June 7, 2002 communication with Kate Krafft, King County Landmarks Program Coordinator and King County Landmark and Heritage Program. Special Tax Valuation for Rehabilitated Historic Properties. Technical Paper No. 42.

- Administer grants for retrofits. The City should pursue fund programs to acquire funds for property owners. See action item 1.6 and 1.7 for possible fund programs.
- Reduce administrative costs. Waive or reduce permitting costs and other administrative fee costs associated with retrofits.
- Provide consultant information and facilitate partnerships. Many property owners do not know where to find information, qualified professionals, etc. to lead retrofits. The City should guide property owners into the retrofitting process by providing a consultant list of qualified engineers approved to retrofit historic buildings. The City should also assist in developing partnerships between consultants and property owners.

1.3 Use hazard scenarios and involve the community in risk assessment. Conduct an economic impact analysis. The analysis will act as a springboard for action.

- Work with the Redmond Chamber of Commerce, small business owners, and property owners to identify the potential losses to small businesses housed in historic landmarks as a result of a disaster.

Source: Federal Emergency Management Administration, 2000. Rebuilding for a More Sustainable Future: An Operational Framework. FEMA Project Impact, Edition 1, November 2000.

- After the February 28 Nisqually Earthquake, a study conducted by Dr. Stephanie Chang, University of Washington, Department of Geography, found that retrofitted historic buildings that housed businesses in south downtown and Pioneer Square remained in business post-disaster versus those businesses that were not housed in retrofitted historic buildings. Refer to Appendix M for copies of a presentation led by Dr. Stephanie Chang.

1.4 Create venues to encourage community participation in retrofitting.

- Organize a community work group focused on brainstorming retrofitting strategies, raising funds, facilitating public-private partnerships, leading education programs or developing informative tools, creating volunteer work committees, and acting as a forum for discussion. Representatives of the work groups should include local government (Redmond Department of Planning & Community Development and Emergency Management), local non-profit organizations (Habitat for Humanity),

Redmond Historical Society, Eastside Heritage Center, Marymoor Museum, and qualified engineers with retrofit experience, etc.

- Use volunteer skill, knowledge, time, and commitment. The work group can organize volunteer non-structural retrofitting parties. Non-structural retrofits involve visiting a small business and helping to secure inventory and other business assets through bolting shelves to walls and securing computers to desks. Enlist the help of Habitat for Humanity to gather materials and volunteers to perform a community effort in limited retrofitting.
- Create methods to partner with large corporations to acquire technical assistance, raise funds, and provide equipment for retrofitting. Many large corporations have access to a wide variety of resources. Encourage large corporations to adopt a historic landmark and sponsor its retrofitting. Develop a “Protect a Historic Jewel” program and capital campaign to encourage sponsorships.
- The City can apply for funds from the Community Development Block Grant to support the work of this community work group. In addition, the community work group can partner with non-profit organizations to raise funds.

1.5 Integrate Hazard Mitigation Planning into other future planning and program efforts such as the Washington State Downtown Revitalization - Main Street Program.

- The Downtown Revitalization Program/Main Street Program administered by the Washington State Office of Community Development and Office of Trade and Economic Development helps communities throughout the state to revitalize the economy, appearance, and image of their traditional business districts. The state provides technical assistance, services, and training to Main Street communities.
- Under the Main Street Program, some business districts create a special assessment district. The special assessment district is a local self-help mechanism that allows businesses and property owners in a defined area to establish self-taxation. These funds may be used for retrofitting. Refer to Port Townsend, WA for an example of Main Street Program participation and coastal Hazard Mitigation Planning. Source: Port Townsend Main Street Program website

  (http://www.ptguide.com/mainstreet/) and Washington State Downtown Revitalization Program website http://www.oted.wa.gov/ed/cea/downtown/index.html)
- Consider linking the community work group (see action item 1.4) to Main Street efforts to incorporate Hazard Mitigation Planning with Main Street initiatives.
- Once implemented, many Main Street sites benefit from funds from private corporations. Consider partnering with Redmond's large corporations to adopt a Main Street landmark.

1.6 Enter into an Interlocal Agreement with King County.

- An Interlocal Agreement will open various funding venues to retrofit historic properties. Under the guises of the agreement, the City of Redmond's landmark designation procedure must follow King County's landmark designation process to become eligible to enter into an agreement.
- One key element in King County's landmark designation process is the "no owner consent" provision. Currently, the City of Redmond's landmark designation process

has an "owner consent" provision. The City will need to either change its current local designation to follow King County's or enter into a partial agreement with King County, thus limiting its ability to be eligible for county funds.

Source: June 7, 2002 communication with Dianna Broadie, Planner, Redmond Department of Planning & Community Development.

- Refer to Penn Central Transportation Co. v. City of New York (1978) 438 U.S. 104, U.S. Supreme Court decision, to obtain background information on the "no owner consent" provision. The background information may be used to support entering into an agreement with King County.

Source: June 7, 2002 communication with Kate Krafft, King County Landmarks Program Coordinator.

1.6a. Pursue funding for retrofitting from King County.
(This action item is contingent upon item 1.6.)

- Landmark Grant Programs
  - Cultural Facilities Program. A cultural organization (either arts or heritage) that owns or uses a King County Landmark is eligible to apply to the Cultural Facilities Program for the purchase, restoration, or rehabilitation of the structure.
  - Landmark Stabilization and Restoration Grant. From time to time, special grant funds are made available for the restoration, stabilization, or rehabilitation of historic properties in King County. In 1993, the King County Council made a special appropriation of $100,000 to stabilize a limited number of endangered county landmarks. In 1995, the Council made $500,000 available as part of an Arts and Heritage Initiative.
- Landmark Restoration Loan Funds. Low-interest loans for restoration projects are available through two programs administered jointly between the Landmarks and Heritage Program, Washington Mutual Bank, and the Valley Community Bank in Duvall. The Landmarks and Heritage Commission reviews proposed loan-funded projects for compliance with restoration and rehabilitation standards, while the banks focus on the financial eligibility of the borrower. Loans are available for the restoration or rehabilitation of privately owned residential properties through Washington Mutual Bank. Loans for restoration and rehabilitation of commercial properties are available through Valley Community Bank. By providing restoration loans at a reduced interest rate, the Landmarks and Heritage Commission assists landmark owners with projects that ensure a longer life for these significant historic resources. Local jurisdictions are also eligible to apply for low-interest loans.

Source: June 7, 2002 communication with Kate Krafft, King County Landmarks Program Coordinator and King County Landmarks and Heritage Program. Incentive Programs for Landmark Owners. Technical Paper No. 26.

1.7 Ensure that historic landmarks located in Redmond's 100-year floodplain participate in the National Flood Insurance Program and pursue funding from the Flood Mitigation Assistance Program for mitigation projects.

- National Flood Insurance Program (NFIP). The purpose of the program is to reduce disaster losses from flooding by providing flood insurance to property owners for structures that otherwise would be uninsurable because of their susceptibility to flooding. Flood insurance underwritten by NFIP is available only in communities that participate in the program.
  - When flood insurance is available for a privately owned structure and flood insurance is not purchased, disaster assistance is not reduced the first time it is requested; however, the disaster assistance applicant must borrow what they would have received from a flood insurance policy. If disaster assistance is requested again and a flood insurance policy has not been executed, disaster assistance is denied.
- Flood Mitigation Assistance Program (FMA). The objective of this program is to reduce the flood hazard to structures that are insurable under NFIP. The FMA is particularly interested in reducing or eliminating repetitive flood insurance loss claims. Grants may be awarded for planning assistance and implementation of mitigation projects. Local jurisdictions can apply for these grants through the Washington State Hazard Mitigation Office.
- Similar to the HMGP, eligible projects include:
  - Existing building retrofits where structures exceed 50 years in age,
  - Acquisition and demolitions/relocations,
  - New construction, and
  - Drainage improvements.

Source: FEMA website (http://www.fema.gov)

Goal 9: Create a Long-Range Recovery Plan for Redmond's Old Town District

Recovery efforts following a major disaster reflect community value choices between competing priorities – returning to normalcy, reducing future vulnerability, and seizing opportunities to improve efficiency, equity, or amenities in the City.

Overview

A recovery plan aims to articulate a community's overall desires in a post-disaster recovery and reconstruction scenario. It provides decision-makers with general guidance as to the policy objectives their decisions must aim to achieve, serves to minimize unintended consequences, and keep the maximum number of stakeholders working together toward the same ultimate goal.

In its Comprehensive Plan, the City of Redmond has documented community values for environmental quality and unique neighborhood urban design characteristics, and promotes sustainable development projects to provide long-term community benefits that have a high environmental and visual quality.

At build-out of the current Plan, the City Center neighborhood is envisioned to be a lively, community gathering place – an urban center with a mix of housing, jobs, shopping, and cultural

activities, as well as a walkable, bikeable center with high capacity transit access. Current use suggests this long-term vision is underway, yet in a major disaster this could be compromised under the pressure of expedience.

OBJECTIVES AND ACTION ITEMS FOR GOAL 9

Objective 1

Ensure recovery planning efforts are consistent with Redmond's values and long-term vision for the Old Town district.

Action Items:

1.1 Develop a post-disaster recovery plan as a sub-element of the Comprehensive Plan and the Mitigation Plan for how Old Town will rebuild following a major event, seeking agreement on process and priorities before the event.

For an outline of recovery plan elements, see Attachment 7 in the Community Process section: Planning for Post-Disaster Recovery, "A Model Recovery and Reconstruction Ordinance."

1.2 Form a task force to develop the plan, assign a lead agency and public official, and identify all stakeholders to provide adequate consideration of all relevant issues.

- Local, State, and Special District officials are needed to address Hazard Mitigation, Emergency Management, City Planning, Transportation, Public Works, Budget and Finance, Legal, Building Safety, Preservation Issues, Solid Waste, Natural Resources, and GIS mapping. Members should include at a minimum:
  - Representatives from the private sector, such as the Chamber of Commerce, utility companies, large employers, and medical facilities.
  - Liaisons with King County, the school board, Red Cross, environmental organizations, social service organizations, and religious or charitable organizations.
  - Representatives from the community at large: neighborhood and homeowner associations, private developers, and contractors.
  - GIS coordination and mapping

Objective 2

Plan proactively to take advantage of post-disaster funding opportunities

Discussion

Outside funding and technical assistance are often available for a limited time following a disaster. Communities that plan and identify a broad framework to direct funding sources will ensure their long-range vision for sustainability.

Action Items:

2.1 Identify resources, timing, and priorities for funding and technical assistance. Develop justification for items and criteria rationale.

- Possible sources of funding include:
  - FEMA Grants,
  - State Emergency Grants,
  - Hazard Mitigation Program Grants, and
  - Low-Interest Small Business Administration (SBA) loans.

Objective 3

Ensure short-term recovery process and related decisions will implement long-term reconstruction goals in the City Center.

Discussion

Historic earthquake recovery case studies identify a range of unintended consequences in the recovery process that can impede successful reconstruction, including:

- Temporary housing often becomes more permanent than originally intended.
- Temporary business locations intended to allow local businesses to operate may become de facto long-term locations.
- Temporary infrastructure provisions.
- Disaster debris dumping and recycling
- Road closures and re-openings.
- Bridge closures and re-openings.
- Restoration of critical infrastructure that might have been suitable for relocation.

Action Items:

3.1 Adopt an interim development moratorium so recovery plan alternatives can be considered, while streamlining repair permits and exempting needs for public health and safety provisions.

3.2 Identify potential properties or sites in or near downtown for temporary housing, business resumption, and debris recycling/dumping, with the awareness that they could remain in place for longer than originally planned.

- Potential receiving sites could include public buildings such as schools and community centers, parks and open space, parking lots, a City-owned right-of-way, or other vacant land.

Objective 4

Seize opportunities for ecological and urban design improvements for Old Town.

Discussion

Redmond's Storm Water Division manages runoff and recharge to protect streams, lakes, and groundwater resources and to prevent flooding and other storm water-related problems. This group reviews almost every proposed development project and initiates storm water construction projects needed to manage runoff and recharge, restore, or enhance stream habitat.

In the current Transportation Planning Program "Connecting Redmond," the Burlington Northern Santa Fe Railroad Right-of-Way is identified as an asset for future recreational trails. With strong public and elected official interest in extending the trail system, this ROW, at 100 feet of vacant land cutting through downtown, offers an attractive design opportunity. When combined with adjacent City land, it provides opportunities for multiple uses.

Design alternatives are in development with consultant team Parsons Brinkerhoff. A variety of trails, gathering places, green spaces, amenities, and uses are being considered.

New development will trigger environmental review and will be subject to the Endangered Species Act, the City's Shoreline Master Program update, and stricter surface/storm water management requirements. Endangered Species Act listings of Chinook salmon and bull trout will contribute to more strict review standards.

When underground utilities are disrupted and require extensive repair, the right-of-way will be under construction and may present an opportunity for street improvements.

Action Items:

4.1 Assess need and consider integrating "Green Infrastructure" design solutions to detain, filter, and/or cool surface runoff in developed areas upstream from the Sammamish River.

- This system could reconnect hydrological functions in the streetscape with a network of landscaped edges, street trees and planters, greenbelt trails, pervious parking surfaces, and pocket parks to handle overflow of the design storm.

4.2 Ensure Recovery Plan is consistent with community and stakeholder desires for the use of the Burlington ROW land, balancing recovery needs and long-term vision. Competing land use needs should be reviewed post-disaster to ensure priorities are met.

- Examples of design prototypes include Seattle Public Utilities' partner projects such as:
  - S.E.A. Street – residential neighborhood near Carkeek Park in North Seattle.
  - West Seattle's Highpoint Community Redevelopment Project, a New Urbanist, multi-family public housing community.

Objective 5

Support business recovery with Main Street Vision and urban design improvements.

Discussion

Old Town's business activity is influenced by urban design strategies. Market forces in rebuilding have been shown to reflect the period before the event but may be exaggerated post event. For redevelopment to be financed, there may be pressure to "upzone" the density, aggregate parcels for larger development, and raise building heights, altering the character and uses of old town.

City Center design regulations aim to shape development in an urban village pattern with small parcels, street-level retail, and building height limits. In a post-disaster recovery scenario, urban design is very closely tied to economic recovery. Thoughtful, quality urban design can support businesses by creating interesting, attractive destinations, supporting specific activities, and conveying a sense of place. In fact, urban design improvements, strategically applied, can generate foot traffic and circulation to support business resumption.

In the current Transportation Planning Program, "Connecting Redmond," future improvements to Redmond Way and Cleveland Street should contribute to and reinforce this area as Redmond's Main Street, which is envisioned as a lively, pedestrian-oriented village with shops, restaurants, and services.

A series of alternatives are being considered for the Redmond Way/Cleveland Street couplet to promote a stronger "main street" image, while also providing for through traffic – facilitated by the City's consulting team, Parsons Brinkerhoff.

Action Items

5.1 Preserve building height limits and any strategic open space by employing existing "Transfer of Development Rights" regulations to shift the density where it best serves the needs of the community, natural resources, and transportation efficiency.

5.2 Actively pursue the vision of Old Town as Redmond's Main Street be encouraging pedestrian uses, character, and activity, and develop specific urban design improvements.

- Implement interpretive signage program along walking and biking routes to enrich local and visitor appreciation and knowledge of natural heritage features, habitat, and cultural history, supporting and stimulating tourism packages.
- Implement design standards for signage, lighting, street trees, street furniture, landscaped medians, and building facades.
- Encourage public art projects to create unique identity and character downtown.
- Clarify and emphasize connections with Town Center, Marymoor Park, Sammamish River, treed areas, open fields, and vistas.
- Clarify and enhance edges of the Old Town district with landscaping planters, street trees, and special paving.

5.3 Evaluate the relocating of public employees to generate more daytime population and/or investigate an anchor tenant, such as a cinema, to stimulate nighttime activity.

CONCLUSION

The goals, objectives and action items presented in this document establish a framework for the City of Redmond to implement both pre- and post-disaster mitigation activities at both the community and the regional level. It recognizes the unique risks and vulnerabilities that face the City of Redmond and its residents. Although the action items were designed with a focus on mitigation, the City is encouraged to pursue both preparedness and response measures whenever mitigation is not feasible.

Many of the action items contained in this document can be undertaken in whole or in part by the City with its own resources. By pursuing regional mitigation initiatives and funding sources whenever possible, the City of Redmond can significantly improve the safety of its communities.

Of all the actions identified in this report, ten priority actions are summarized below. These top ten items were selected based on guidance from City leaders, the effectiveness of the strategy at reducing vulnerability, and the comprehensive mitigation achieved by implementation.

1. Develop alternative emergency government operations capabilities outside of high-risk areas.
2. Partner with King County, neighboring jurisdictions, and WSDOT to harden transportation routes.
3. Strengthen relationships between corporations and vendors, including provisions for Emergency Operations Centers and mutual aid.
4. Reduce risk to the Olympic Pipeline and surrounding areas.
5. Implement neighborhood-targeted risk reduction programs.
6. Design events promoting business continuity.
7. Adopt a post-disaster recovery plan for Old Town.
8. Retrofit historic district structures.
9. Support regional mitigation initiatives.
10. Enhance existing GIS capabilities emphasizing hazard analysis.

These ten items are listed in full as follows, extracted from their respective issue in the text and reproduced here. The University of Washington project team determined ranking from 1 to 10 after the public participation process with City of Redmond officials.

TEN PRIORITY ACTION ITEMS

Priority Action Item 1

Develop alternative emergency government operations capabilities outside of high-risk areas.

This action item is drawn from Goal 1: Community Resiliency to Large-Scale Regional Events. The Objective and Action Items that are relevant to the above priority item are as follows. Numbering refers to their placement in the original Issue Section.

Goal 1, Objective 1

Develop alternative emergency government operations capabilities outside of high-risk areas.

Relevant Action Items:

1.1 Decentralize local government operations.

- The City should attempt to decentralize its local government offices and operations by relocating specific departments to alternative sites throughout the City that are not located in known hazard zones.

1.2 Consider stringent retrofits and protective measures if relocation is not feasible, to ensure that its essential facilities are resilient to multiple types of hazards.

- The resiliency of City facilities should be a top priority in hazards mitigation. The City should utilize the most current design methods to ensure that its facilities are strong enough to withstand a disaster.
- The City should publicize its efforts to decentralize and/or retrofit its facilities as a model to support Redmond's commitment to hazards mitigation.

1.3 Construct an alternative EOC (Emergency Operations Center) outside of the known hazard zone.

- The City should invest in the construction of an additional EOC. The site should be fully equipped and ready to implement in the event that the existing EOC is damaged or inoperable.

Priority Action Item 2

Partner with King County, neighboring jurisdictions, and WSDOT to harden transportation routes.

This action is drawn from Goal 5: Isolation Resulting From Disruption to Lifelines and Infrastructure. The objective and action items that are relevant to the above item are as follows. Numbering refers to their placement in the original Issue Section.

Goal 5, Objective 1

To reduce the disruption to transportation infrastructure from hazard events, Redmond should reduce the vulnerability of transportation infrastructure to hazard events.

Relevant Action Items:

1.1 Cooperate with neighboring jurisdictions, and planning and transportation agencies to harden vulnerabilities of transportation routes. Regional planning should reduce transportation disruption between jurisdictions. The inter-connection of businesses and transportation networks in this region amplifies the effects of disruption of goods and commuters across the region. Adjacent jurisdictions, the county, and the state must coordinate prevention and response to transportation disruption from hazard events on all scales.

- Identify and prioritize regional transportation corridors in order of their respective importance to community and business continuity throughout the region. Focus should be on key interlocal thoroughfares and regional transportation systems. The inter-jurisdictional arterial network represents an important supplement to highway capacity throughout eastside cities.
- Identify and prioritize key vulnerabilities of regional transportation routes. Prioritize the vulnerabilities based on importance of the disrupted route, the scale of the potential disruption, and the effectiveness of mitigation investments.
- Develop a strategy to harden transportation vulnerabilities on a regional basis, based on the prioritization of routes and vulnerabilities. In addition to addressing the hazard and the vulnerability, this may include identifying appropriate responders and establishing detour routes on a regional scale to expedite response to hazard events.
- The extensive research of the Eastside Transportation Partnership to identify regional priority road improvements provides key groundwork for this project. ETP's Mobility Action Priorities has identified regional priority routes and improvements. This action item would add the consideration of roadway vulnerabilities (landslide-prone slopes, frequently-flooded areas, seismic retrofitting, etc.) and disaster-response contingency plans (detour routes and response strategies) to the existing comprehensive analysis that has already been performed.
- The collaborative ETP framework brings together regional leaders of jurisdictions and agencies, and provides a natural framework for further action. The City of Redmond is already engaged in transportation planning efforts in an intra-city and a regional context, and has engaged neighboring jurisdictions and agencies in these efforts.
- Pending entry into a regional planning effort, Redmond may begin by comprehensive analysis and prioritization of vulnerable roadways within their jurisdiction, and contingency planning with detour routes and response strategies.
- Additional contributions of road priority research, road vulnerability research, and existing regional networks may come from Project Impact, Pillars transportation research, King County Transportation Coalition, Seattle Transit Initiative, and Puget Sound Regional Council.

Priority Action Item 3

Strengthen relationships between corporations and vendors, including provisions for Emergency Operations Centers and mutual aid.

This action is drawn from Goal 4: Vulnerability of Large Corporations. The objective and action items that that are relevant to the above item are as follows. Numbering refers to their placement in the original Issue Section.

Goal 4, Objective 1

To facilitate partnerships between large corporations and local small businesses.

Relevant Action Items:

1.4 Encourage large corporations to include their small business vendors and tenant businesses in their emergency management planning.

- As mentioned previously, large corporations benefit from having a variety of resources aimed at strengthening their resiliency to hazard events. Large corporations can share their resources, thereby increasing their economic resiliency in their vendors and tenant businesses through the following suggestions.
  - Include small businesses in training exercises. Many large corporations have office space that mimics the impacts of a hazard event (i.e., broken light fixtures, toppled shelves, etc.) to educate employees on evacuation and search and rescue techniques. Small businesses would benefit from training exercises that large corporations have to offer.
  - Facilitate a mentoring program between large corporations and small businesses. Knowledgeable corporate staff can guide small businesses in the creation of resumption plans, identify appropriate insurance plans, and refer qualified professionals for building retrofits, etc.

1.5 Facilitate cooperative agreements between large corporations and local small businesses in a recovery scenario.

- The City can facilitate partnerships between large corporations and local small businesses by identifying shared risks and opportunities. Large corporations depend on local vendors for production, and local small businesses depend on large corporation contracts for production as well.
- Given the shared risks, the City can facilitate cooperative agreements that result in shared opportunities. Cooperative agreements may be comprised of the following key components.
  - Local small businesses would agree to develop business resumption plans, train employees, and perform structural and non-structural retrofitting to protect their people, assets, and business operations.
  - Large corporations would agree to provide facility space and essential business functions (phone, fax, computer, etc.) during a recovery period so that small businesses can recover quickly.

Priority Action Item 4

Reduce risk to the Olympic Pipeline and surrounding areas.

This item is drawn from Goal 6: Hazards Presented by High-Risk Utilities and Facilities. The objective and action items that are relevant to the above action are as follows. Numbering refers to their placement in the original Issue Section.

Goal 6, Objective 1

To reduce the risk posed by high-risk utilities and facilities, address the vulnerability of these systems.

Relevant Action Items:

1.1 Reduce the risk surrounding an Olympic Pipeline rupture.

- The Olympic Pipeline runs along landslide-prone slopes for much of its length through Redmond. Slopes should be assessed for stability, restoration, re-vegetation needs, and needed drainage improvements. Strict site design, storm water drainage, and vegetation retention standards should be applied to these areas to preserve slope stability. At areas of vulnerability to landslides, sensors triggered by slope movement could provide an early warning system for response. Identify areas where the Olympic Pipeline is exposed above the ground and explore possibilities of burying pipeline.
- Strengthening the structure and integrity of all high-risk utility systems and high-risk facilities may include such measures as:
  - increased frequency of shut-off valves.
  - remotely located control capabilities.
  - structural retrofitting of these high-risk systems.
  - restriction of access.
  - adequate signage along pipelines to prevent accidental disturbance.
  - frequent inspections to ensure compliance with safety/performance standards.
  - relocation to minimize the property and residents vulnerable to these hazards.
- Identify response capabilities. Redmond is working on a response plan to deal with Olympic Pipeline hazard events. The managing company and the City of Redmond have a working relationship. The Redmond Fire Department is trained with regard to shut-off valves and response procedures in the event of disruption to the pipeline. Further coordination of protocols and capabilities may improve response.
- Public education to notify local citizens of the presence of the high-risk utility or facility in their neighborhood may improve the preparation and response by local residents. Education may include detecting warning signs, appropriate contacts in the event of an emergency, site-specific concerns, and evacuation routes.
- Redmond and the Olympic Pipeline Company have information about the location and vulnerabilities of the route. Redmond could perform more extensive analysis of the pipeline route including GIS assessment of parcels, drainages, ownership, and

flow routes, field assessments of vulnerabilities, and work with neighboring jurisdictions on cross-border reduction of vulnerabilities and response.

Priority Action Item 5

Implement neighborhood-targeted risk reduction programs.

This action is drawn from Goal 2: Vulnerability of Single-Family Homes and Home-Based Businesses to a Variety of Hazards. The objectives and action items that are relevant to the above priority item are as follows. Numbering refers to their placement in the original Issue Section.

Goal 2, Objective 1

To reduce the vulnerability of single-family homes in at-risk neighborhoods to a variety of hazards.

Relevant Action Items:

1.1 Implement neighborhood-based risk reduction programs.

Landslides

- Educate homeowners regarding steep slope issues and how to minimize potential for landslides.
  - Topics could include the hazards of dumping fill and debris at the head of a steep slope, erosion control landscaping, and storm water drainage problems.
  - This could be addressed and coordinated by the Public Works Department.

Earthquakes and Ground Shaking

- Promote technical assistance information programs such as the Project Impact Home Retrofit Program, for homeowners addressing items such as seismic strengthening of homes, and non-structural retrofitting.
  - To promote and help education of homeowners, the City could hire an intern from a local high school to canvas at-risk homes and neighborhoods with information regarding the Home Retrofit Program. The City and the Building Department would prepare the information to distribute to homeowners.
  - Libraries, insurance companies, and realtors can also be used as a means to provide information.
  - Availability of private sponsors and organizations should also be investigated to provide motivation and encourage the availability of a tool lending library that gives approximate numbers and costs of certain types of retrofitting.
  - The Project Impact training should include non-structural retrofit training as well as information for structural retrofits.
- Provide financial incentives for retrofitting for neighborhoods at highest risk.

- Consider applying for home and home-based business retrofitting assistance through the Hazard Mitigation Grant Program. (Refer to Historical and Cultural Resource Section).

Winter Storms

- Host public education workshops for single-family homeowners regarding vulnerabilities to winter storms.
  - Issues to discuss could include tree management and how residents handle short-term isolation such as creation and maintenance of an isolation kit containing food and water for 72 hours.

Wildland Interface Fires

- Implement public fire safety programs that disseminate fire safety information to the public, especially in times of increased vulnerability.
  - Efforts can address types of combustible roof coverings, fire safe construction techniques for fire hazard areas, and importance of clearing brush from around homes.
  - The City and Fire Department can coordinate programs like this.
  - Information should be provided to those homes located in isolated fire hazard areas in Redmond and available at the Fire Department for interested individuals in times of increased vulnerability and drought conditions.
- Encourage fire resistant landscaping techniques within the City of Redmond.
  - The City, in coordination with the Fire Department, should hold forums on fire resistant planting and encourage the development of defensible space around homes.

Priority Action Item 6

Design events promoting business continuity.

This action item is drawn from Goal 3: Vulnerability of Small Businesses. The objective and action items that are relevant to the above priority are as follows. Numbering refers to their placement in the original Issue Section.

Goal 3, Objective 1

To ensure survivability and expedite business resumption following a disaster.

Relevant Action Items:

1.1 Design events to promote business continuity.

- The Chamber of Commerce and small business organizations working with other eastside cities to share costs of work and address inter-jurisdictional Issues could coordinate this.

- Specific educational topics should include preparation for short-term business disruptions and contingency plans for emergency situations.
- Relevant information includes structural improvements (redundancy in communications systems, generators) as well as improving functional connection and recovery between businesses that rely heavily upon one another for function.

Priority Action Item 7

Adopt a post-disaster Recovery Plan for Old Town.

This action item is drawn from Goal 9: Long-Range Recovery of Redmond's Old Town District. The objective and action items that are relevant to the above priority action items are as follows. Numbering refers to their placement in the original Issue Section.

Goal 9, Objective 1

Ensure recovery efforts are consistent with Redmond's values and long-term vision for the Old Town district.

Relevant Action Items:

1.1 Develop a post-disaster recovery plan as a sub-element of the Comprehensive Plan or Mitigation Plan for how Old Town will rebuild following a major event, seeking agreement on process and priorities before the event.

- For an outline of recovery plan elements, see Appendix L: Planning for Post-Disaster Recovery, "A Model Recovery and Reconstruction Ordinance," pp 149-167.

1.2 Form a task force to develop the plan, assign a lead agency and public official, and identify all stakeholders to provide adequate consideration of all relevant issues.

- Local, State, and Special District Officials are needed to address Hazard Mitigation, Emergency Management, City Planning, Transportation, Public Works, Budget and Finance, Legal, Building Safety, Preservation Issues, Solid Waste, Natural Resources, and GIS mapping. Members should include at a minimum:
  - Representatives from the private sector, such as the Chamber of Commerce, utility companies, large employers, and medical facilities.
  - Liaisons with King County, the school board, Red Cross, environmental organizations, social service organizations, and religious or charitable organizations.
  - Representatives from the community at large: neighborhood and homeowner associations, private developers, and contractors.
  - GIS coordination and mapping

Priority Action Item 8

Retrofit historic district structures.

This action item is drawn from Goal 8: Vulnerability of Historic and Cultural Resources. The objective and action items that are relevant to the above priority action are as follows. Numbering refers to their placement in the original Issue Section.

Goal 8, Objective 1

Retrofit designated historic landmarks.

Relevant Action Items:

1.1 Create an inventory of un-reinforced masonry and wood-frame historic landmarks.

- As a first step to encourage retrofitting, the City should inventory vulnerable historic properties to determine retrofitting needs and prioritize retrofitting projects.
- The City can begin by utilizing the Rapid Screening Procedure developed by FEMA and subsequently conducting a more technical, in-depth inspection of individual buildings.

1.2 Develop incentives to encourage retrofitting. Possible incentives could include:

- Building code flexibility. Pre-hazard retrofit is costly and is unlikely to occur without modified building codes that facilitate economically feasible, incremental improvements in building safety. For example, the Uniform Code for Building Conservation (UCBC) and the State Historic Building Code " . . . attempt to apply different standards for un-reinforced masonry buildings that would improve building safety in California."

Source: Federal Emergency Management Administration and American Planning Association, 1998. Planning for Post-Disaster Recovery and Reconstruction, Chicago, IL: American Planning Association, (Page 298-299).

- Property tax relief. King County administers a Special Tax Valuation for Rehabilitated Historic Properties Program. For up to ten years, qualified rehabilitation costs will be subtracted from the total assessed value of the property. Projects such as the Maloney Store in Skykomish, the McGrath Café & Hotel Building in North Bend, and the North Bend Theater were retrofitted in part as a result of special tax valuation. The City of Redmond can take advantage of this program only if the City enters into an Interlocal Agreement with King County. See action item 1.6 for further discussion.

Source: June 7, 2002 communication with Kate Krafft, King County Landmarks Program Coordinator and King County Landmark and Heritage Program. Special Tax Valuation for Rehabilitated Historic Properties. Technical Paper No. 42.

- Administer grants for retrofits. The City should pursue fund programs to acquire funds for property owners. See action item 1.6 and 1.7 for possible fund programs.

- Reduce administrative costs. Waive or reduce permitting costs and other administrative fee costs associated with retrofits.
- Provide consultant information and facilitate partnerships. Many property owners do not know where to find information, qualified professionals, etc. to lead retrofits. The City should guide property owners into the retrofitting process by providing a consultant list of qualified engineers approved to retrofit historic buildings. The City should also assist in developing partnerships between consultants and property owners.

Priority Action Item 9

Support regional mitigation initiatives.

This action item is drawn from Goal 1: Community Resiliency to Large-Scale Regional Events. The objective and action items that are relevant to the above priority action item are as follows. Numbering refers to their placement in the original Issue Section.

Goal 1, Objective 4

Support a region-based focus on mitigation and sustainability through working with neighboring cities and the county in strengthening public education and outreach programs.

Relevant Action items:

4.1 Increase public awareness and preparedness by developing a series of regionally available public workshops or seminars to educate homeowners and local businesses on earthquake-resilient practices.

- The City, in cooperation with neighboring cities and the county, should develop a series of seminars focusing on disaster preparedness, community resiliency, and mitigation, and continue to utilize its local schools as conference centers for hosting these workshops.
- The City, in cooperation with the county, should supplement the existing school-based preparedness programs with after-school programs geared towards students' parents. Having the seminars in the evening and encouraging parents to participate would result in safer homes and communities.

4.2 Increase community recovery capabilities by creating a system whereby local residents and businesses can immediately submit damage information to responders and the proper authorities.

- Rapid submittal of damage estimates is essential following a disaster and should be a high priority for local residents. The disaster information center (refer to objectives 2, action item 2.2) could provide a convenient means of submitting this information digitally.
- The City could consult with the USGS and the National Weather Service to determine how to best approach this type of program. The USGS utilized its web-based capabilities to gather earthquake information from citizens through its Earthquake Hazards Program's "earthquake reporting website." The National Weather Service radio is becoming an all-hazards service.

Priority Action Item 10

Enhance existing GIS capabilities emphasizing hazard analysis.

This item is drawn from Goal 1: Community Resiliency to Large-Scale Regional Events. The objective and action items that are relevant to the above priority action item are as follows. Numbering refers to their placement in the original Issue Section.

Goal 1, Objective 5

Identify and protect critical facilities in the City of Redmond.

Relevant Action Items:

5.2 Continue hazards mapping efforts and distribute data to local officials as it develops to enhance incorporation of mitigation into Land Use Planning.

- The City's GIS Department should seek to establish and/or strengthen relationships with other jurisdictions, consultants, and academia, to ensure that maps are as up-to-date as possible, and that local planners have the best available information.

The primary focus of this document is mitigation, which is "any sustained action that reduces or eliminates long-term risk to people and property from natural hazards and their effects." We are focusing on goals and objectives that reduce the level of risk where possible, thereby limiting the need for preparedness. Where mitigation is not feasible or until an acceptable level of mitigation can be achieved, the document offers action items focused on preparedness and response. Action items were established that seek to address each goal individually. These actions were driven by the goals, objectives and visions stated in the City of Redmond Comprehensive Plan, and they are consistent with those statements. The document supports the capitalization on the opportunities presented following a disaster

The City's willingness to participate in this project and its commitment to Hazard Mitigation illustrates Redmond's goals of safer, more resilient communities. Through this project, the City has established a strong relationship with the University of Washington.

Many people from varying backgrounds contributed to the information contained in this document. City Officials, Planners, Law Enforcement and Fire Personnel, local residents, business owners, and University of Washington project staff all provided input that was essential to the development of this Plan.

PRIORITIZATION PROCESS

Of all the actions identified in this report, ten priority items are summarized below. These top ten action items were selected based on guidance from City leaders, the effectiveness of the strategy at reducing vulnerability, and the comprehensive mitigation achieved by implementation.

The following matrix offers specific information on when the items will be implemented and which City Agency is charged with responsibility for that item.

***Further Analysis Requirements**:*

This Hazards Mitigation Plan and the City of Redmond acknowledge that these action items have not gone through a rigorous and detailed environmental, historic or benefit to cost analyses. Although such considerations played a role in the prioritization of these action items, largely through the development of the probable scenarios, further analyses will be undertaken before these action items become scheduled for implementation.

SEPA, Historic Preservation Act, and benefit to cost requirements and guidance will be met by the City of Redmond. Also, the City of Redmond will take advantage of the newly developed benefit to cost software made available by FEMA before project implementation.

Matrix for Prioritization of the Top 10 Action Items

	Action Item	Lead Agency	Time Frame	Funding Source
1	Identify alternative emergency government operations capability outside of high-risk areas.	Emergency Management / Police / Fire	1 to 3 years	General Fund
2	Partner with King County, neighboring jurisdictions, and WSDOT to harden transportation routes.	Public Works	1 to 5 years	CIP Funds
3	Strengthen relationships between corporations and vendors, including provisions for EOC's and mutual aid.	Emergency Management	1 to 3 years	Emergency Management / Grant Funds
4	Reduce risk to the Olympic Pipeline and surrounding areas.	Planning / Fire	1 year	General Fund
5	Implement neighborhood-targeted risk reduction programs.	Planning / Emergency Management	1 to 5 years	General Fund / Grant Funds
6	Design events promoting business continuity.	Planning / Emergency Management	1 to 2 years	General Fund / Grant Funds
7	Adopt a post-disaster Recovery Plan for Old Town.	Planning	1 to 4 years	General Funds
8	Retrofit Historic District structures.	Planning / Emergency Management	3 to 10 years	Grant Funds

9	Support regional mitigation initiatives.	Emergency Management	1 to 3 years	Emergency Management
10	Enhance existing GIS capabilities emphasizing hazard analysis.	Fire / IS	1 to 5 years	General Fund

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